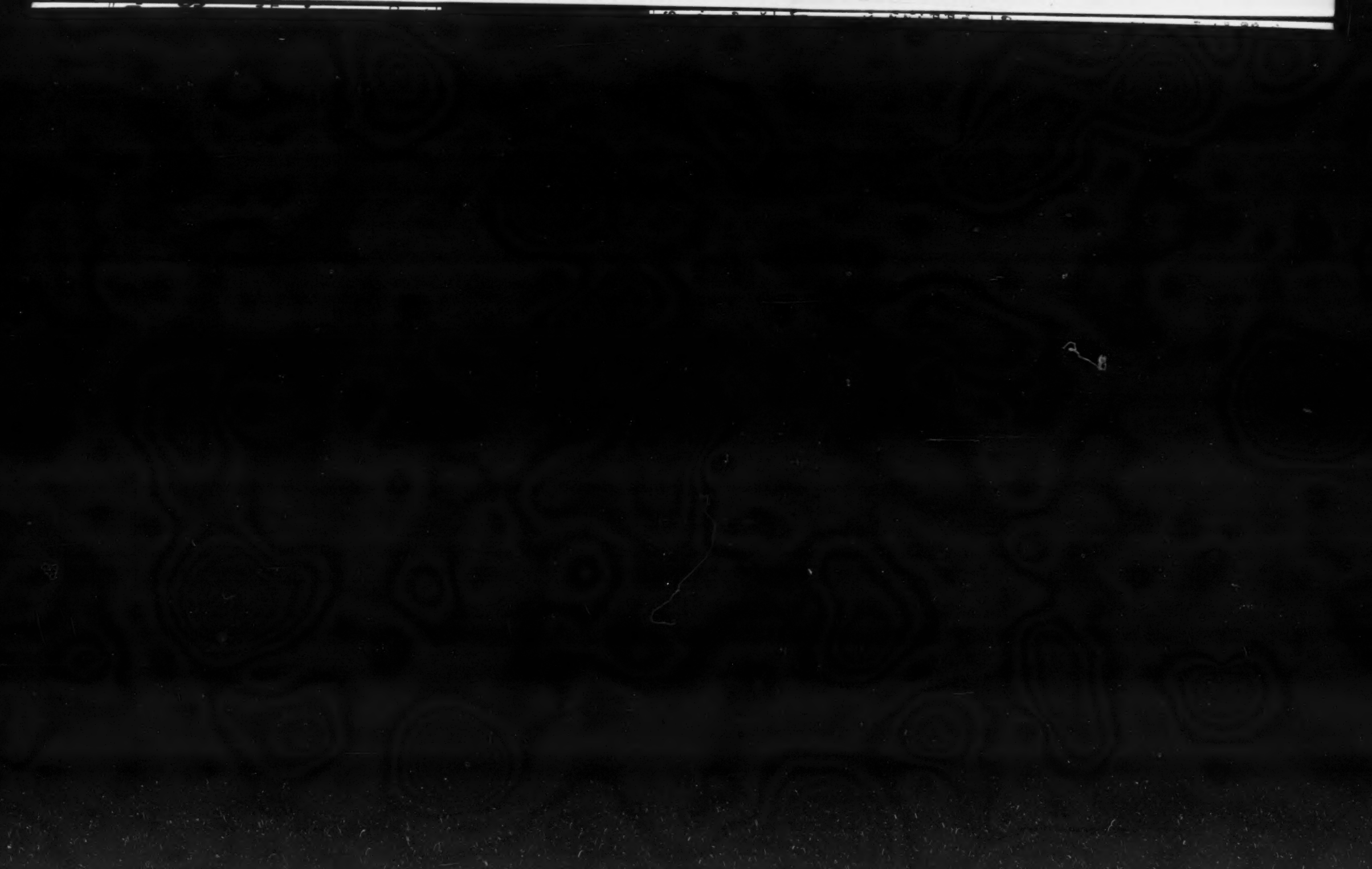
THE IRON AGE

A Review of the Hardware, Iron, Machinery and Metal Trades.

Published every Thursday Morning by David Williams Co., 232-238 William St., New York.

Vol. 72: No. 1. *New York Thursday, July 2, 1903.* $5.00 a Year, including Postage. Single Copies, 15 Cents.



THE IRON AGE

THURSDAY, JULY 2, 1903.

Sixty-Foot Vertical Boring and Turning Mill.*

Designed by John Riddell, Mechanical Superintendent of the General Electric Company. Schnectady, N. Y.

The mill herein described was made necessary owing to the constantly increasing dimensions of dynamo electric machines. On account of its immense proportions and weight of material, it was deemed necessary to build it in the factory where it was to be used, and it has been suggested by several disinterested parties that a general description of the machine would be of interest to the members of the American Society of Mechanical Engineers, or any others interested in large machine work.

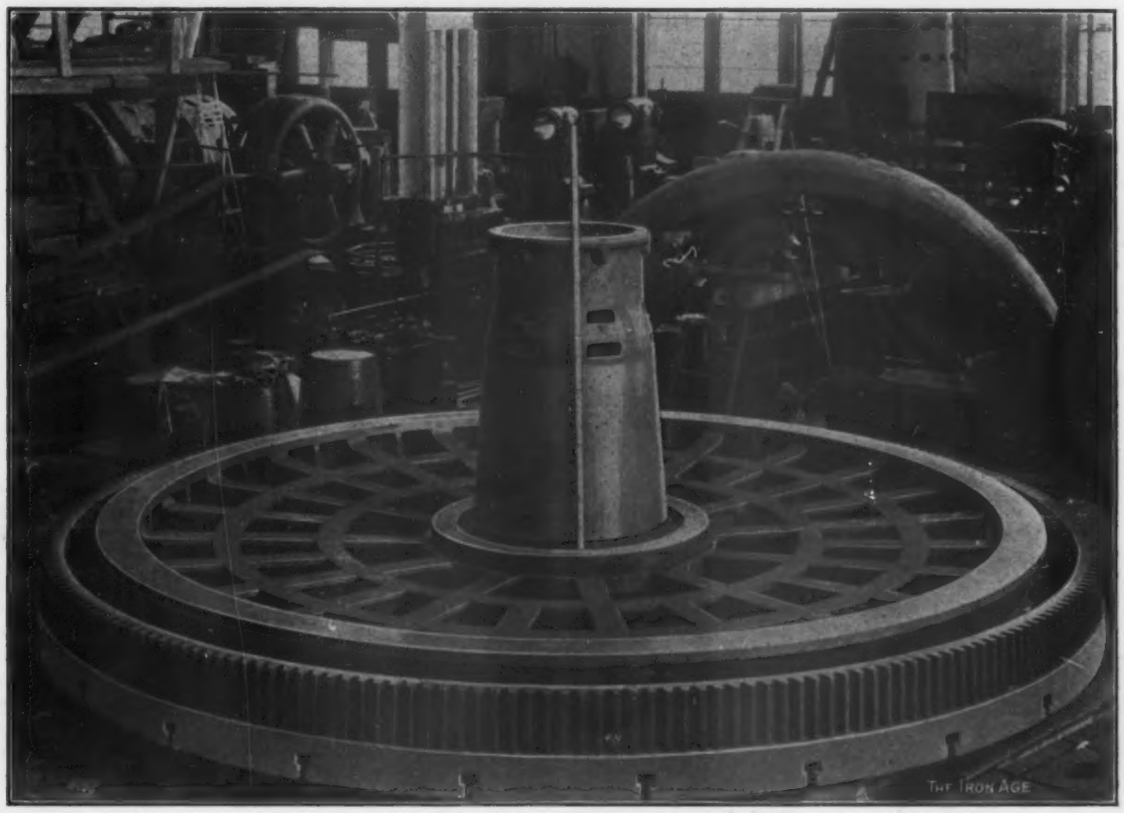
Possibly the best way to describe this machine would be to start with the foundation.

Foundation.

This is shown in section in Figs. 5 and 6, which also show a section through the whole machine. From the floor line to the bottom of foundation is 22 feet 6 inches. When the excavation was made for this foundation a bed of quicksand was struck at the depth of 8 feet, which rendered it necessary to have a steel tank, 9 feet in diameter by 12 feet 9½ inches in hight, sunk to keep back the sand and water. It was found impossible to sink this tank by the regular method of digging, and the hydraulic process of sinking was resorted to. After the tank was in place, as much earth as possible was removed from the outside, gradually rounding the bottom up toward the outer edge of the foundation, the object being to keep the bottom of the foundation in as nearly a semispherical form as possible, the idea being that in settling it would adjust itself in a solid mass. In building the foundation the advantage of having an ample number of passageways of liberal size was taken into consideration, with the result that the working parts of under side of mill are comparatively of as easy access as the parts above the floor. This is shown in Fig. 6.

Bed Plate.

The bed plate is 20 feet in diameter, and for convenience is made in three pieces, one pattern only being necessary. Each segment weighs 26,900 pounds, making a total for bed plate of 80,700 pounds. The bed plate has two ways for table to revolve upon. The center of outside way is 17 feet 6 inches in diameter and is 10 inches wide. The center of inside way is 5 feet diameter and is 6 inches wide. The outside way has a bearing surface of 6600 square inches, and the inside way a bearing surface of 1130 square inches, making a total bearing surface for table of 7730 square inches. The maximum approximate total weight, including table, that the bed plate is expected to carry is 300 tons, thus making a pressure of 77.6 pounds per square inch. It is also bored out in the center to a diameter of 4 feet to receive the main bearing for table spindle. It has a projecting shelf or flange around entire periphery, faced on upper side to form a support for floor plates, Fig. 7, which are bolted securely to the same, and is also faced on bottom to form seat for bar support.



Face Plate and Main Spindle.

A 60-FOOT VERTICAL BORING AND TURNING MILL.

* This paper was presented by Mr. Riddell at the Saratoga meeting of the American Society of Mechanical Engineers.

Ample means are provided for oiling the table ways, by flooding or by pressure; the flanges at sides of ways form an oil well and are of sufficient hight to allow a head of 2 inches of oil above surface of bearing at all times. (It may be of interest to know that 32 gallons of oil are required for this purpose.)

There are two sets of oil channels, one consisting of a number of grooves ½ inch wide by ½ inch deep, running diagonally across the ways, in opposite directions (open at the ends), subdividing the same into a number of triangular faces, free circulation being thus induced from side to side of bearing. The pressure system consists of a number of pipes from pressure main terminating in radial oil grooves in ways.

The pressure and return piping being of brass, all branches are bent, no elbows being used. Two mains extend entirely around bed plate, as seen in vertical section of mill, the lower being the pressure and upper the return mains. Six 1-inch branches from return main pass up through oil well at side of ways and terminate in open pipes 2 inches high, to take care of surplus oil. All other bearings are piped to a central location and are fitted with sight-feed oil cups.

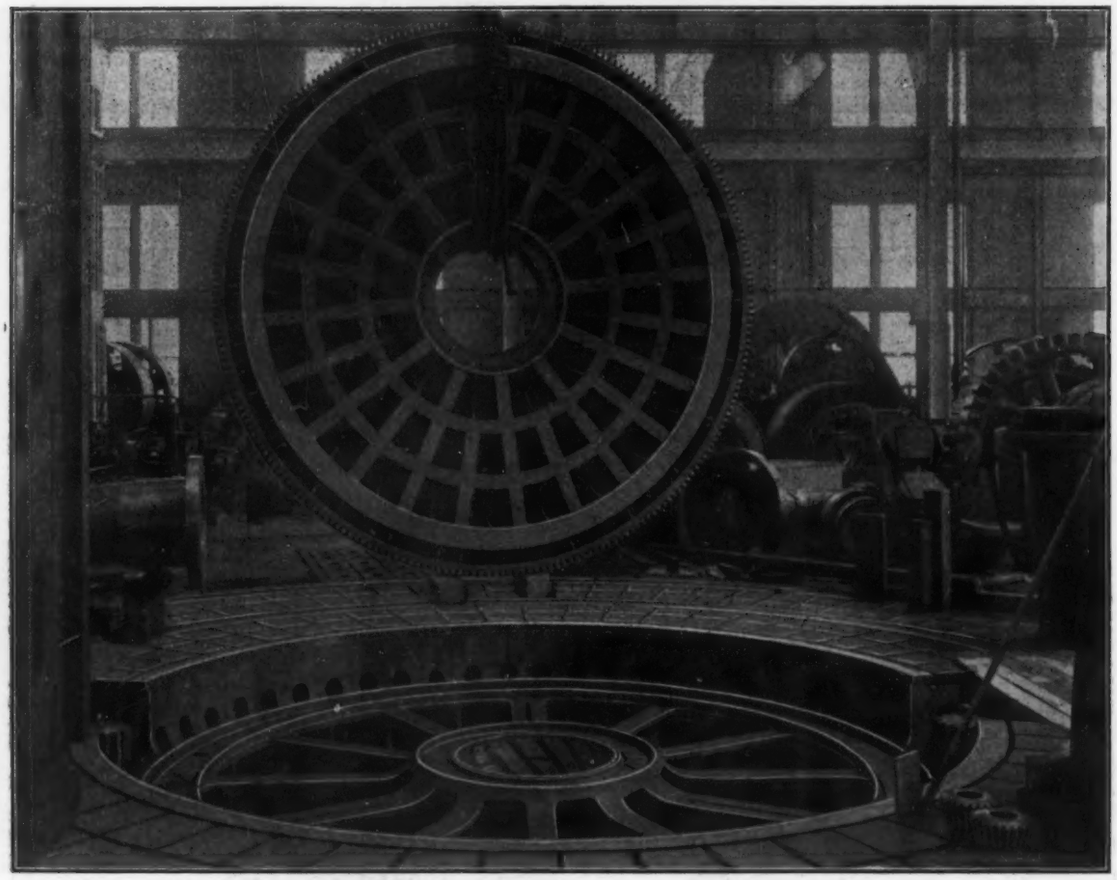


Fig. 2.—Face Plate and Its Bearing.

A 60-FOOT VERTICAL BORING AND TURNING MILL.

Table.

The table, Figs. 1 and 2, is 20 feet 4 inches in diameter, and is made in three sections, each section weighing 26,300 pounds; total weight of table, 78,900 pounds. The table has a range of speeds from one revolution in eight minutes to one revolution in one minute. The greatest gear reduction obtained for driving table is 1040 to 1. The table is driven through a spur gear 20 feet pitch diameter, 3.1416 inches circumferential pitch, 10½ inches face, made in two pieces of gun iron, bolted to under side of table, Fig. 4. This gear weighs 14,000 pounds and is driven by two pinions, 180 degrees apart. Pinions are 15 pitch diameter and are made of forged steel.

The spindle for the table has a length of 6 feet 9 inches, and greatest diameter 5 feet 6 inches where it rests in inner way of bed plate, and has a taper of ¾ inch per foot on main bearing, being 46 inches diameter at large end and 40 inches long, weight of same being 10,100 pounds It is also bored out and splined at each end to receive bearings for the boring bar sleeve, and also adjustments for the same. Bearing for table spindle is 48 inches outside diameter, 40 inches long; has babbitted pockets on inside for spindle bearing, Fig. 1, bored to a diameter of 46 inches at large end, with ¾-inch taper per foot, and is adjusted by means of set screws in a ring, which is bolted to under side of bed plate, one-half of the screws being arranged to push bearing upward, the other half to draw down. This bearing weighs 3700 pounds. Immediately outside of revolving table there are 14 floor plates, making a stationary table of 44 feet diameter, each plate weighing 19,000 pounds, making a total of 266,000 pounds. Outside of this table there extend 15 plates radially 6 feet wide by 10 feet 6 inches long, making complete outside diameter of 65 feet. Each of these plates weighs 13,000 pounds, making a total weight for the 15 of 195,000 pounds.

The stationary table has two tracks upon its surface, center of inside track being 30 feet diameter and center of outside track 40 feet diameter, both 12 inches wide. The object of these tracks is to form an outer bearing for support, on which boring tool heads rest when boring out large fly wheels or frames, or forming outer bearing for frames or fly wheels when they are being revolved by table and are being turned on their outside diameters. These tracks are covered by a moving platform to protect them from chips or dirt, and upon which the operator may stand.

Boring Bar.

The bar support, Fig. 4, consists of a cast iron shell made up of a number of segments which have been machined up and bolted together, and is suspended from

under side of bed plate. At A is shown a seat for bevel pinion on main table driving shaft; at B seats for bearings of diagonal shafts; at C seats for main driving shaft of boring bar, and at D a seat for step bearing of bar drive, while at bottom is support for boring bar.

The boring bar was designed for boring out work varying from 1 to 8 feet in diameter, is 24 inches diameter by 16 feet long, and is made to revolve in either direction by means of suitable gearing and reversing clutches through a gear 69½ inches diameter by 6 inches face, which is placed upon the lower end of the bar sleeve. This sleeve, which weighs 8450 pounds, is 8 feet 1½ inches long, rests and revolves in flat bearing in the top of the table spindle, and is centered by means of the tapered bearings A and B, placed respectively at the top and bottom of the main spindle, keyed to the same to prevent turning, but adjustable vertically by suitable adjusting screws, as shown in vertical section of mill. This sleeve has feathers fastened in the bore, through which the bar passes.

The bar, which is to have a hydraulic feed, is made in two sections, each a cylinder, the upper 12 inches diameter by 4 feet 8 inches travel, and the lower 18 inches, bushed with copper sleeve to 17½ inches diameter, and has a travel of 8 feet. The piston of lower cylinder is stationary and mounted securely upon a hollow piston rod, which contains an internal tube, which passes up through the piston to upper end of cylinder, oil for upper end passing through this tube and for lower end through outside or piston rod tube, and by means of port in the same near its connection with the piston passes into cylinder; thus, by admitting oil to under side of piston, the bar or cylinder moves downward and admission to upper side gives motion upward.

Should it be necessary to bore out a piece of work 24 inches or less in diameter recourse is then had to the upper cylinder, where we have a double acting piston, the rod of which is 8 inches diameter and forms the boring bar. Oil for operating this plunger is obtained as follows: The valve in bottom cylinder head is opened, the oil passes through valve up through pipe which is imbedded in side of bar, up to and through inner head between upper and lower cylinders, thence to under side of top piston; the feed being controlled by the quantity of oil allowed to escape from upper side of piston. It will thus be seen that pressure is on both sides of both pistons at the same time, the pressure from pump being at the lower side of top piston and lower side of bottom piston, while the exhaust is on opposite side of pistons; this is to prevent any jumping effect of the bars in vertical direction when blow holes or other obstructions are encountered. By reversing the main operating valve feed in opposite direction is obtained, the top of large bar and small plunger being made with taper sockets and key to carry boring heads, these boring heads being provided with suitable cross feed slides to bore to diameter required. Thus when keyways are required, the work may be done by removing the boring tools and substituting slotting tools, and then by manipulating the main operating valve the bar may be given the cutting speed required and also have a quick return.

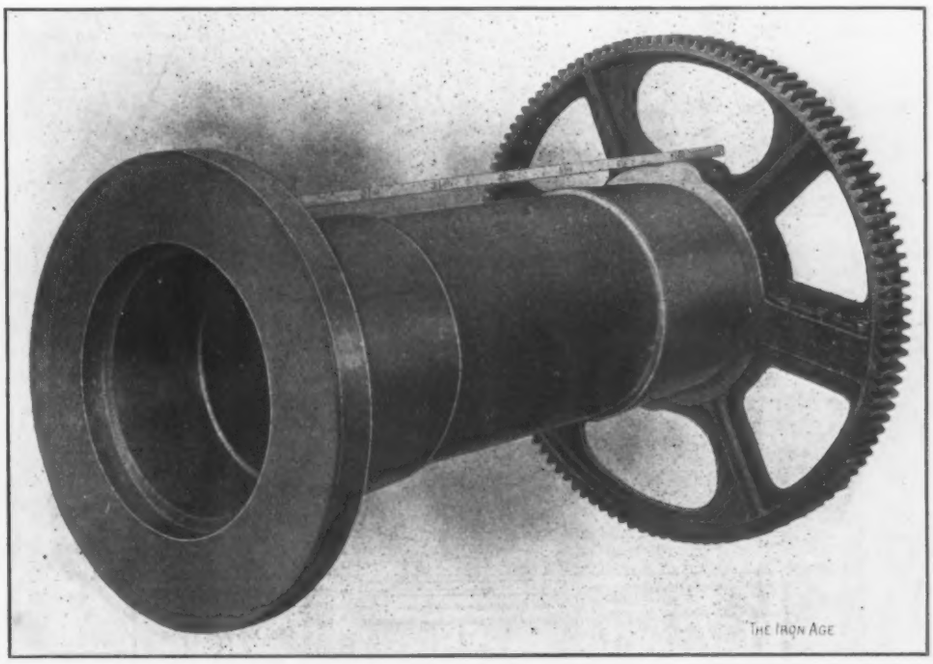


Fig. 3.—Inside Spindle.

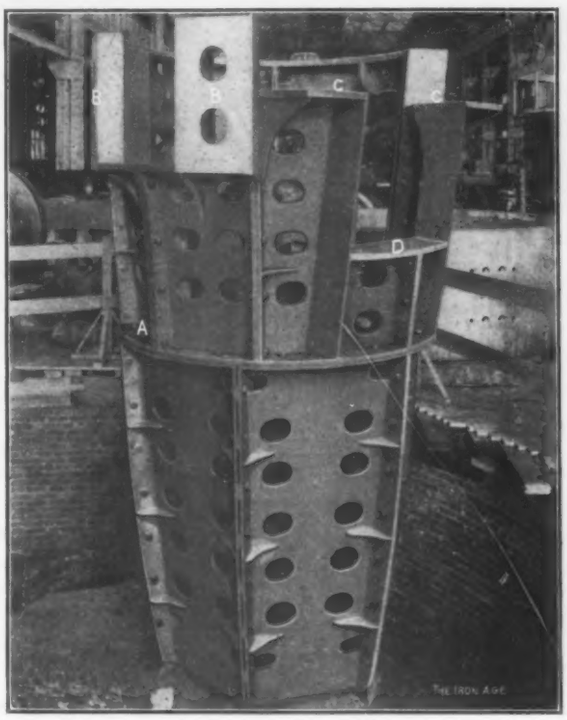


Fig. 4.—Support for Bearings.

A 60-FOOT VERTICAL BORING AND TURNING MILL.

Standards or Housings.

The housings are constructed entirely different from the standard type of vertical boring mill. There are two large portable uprights 15 feet high, having one part of

upright standing in same line as cross rail and the other standing at right angles thereto, both forming part of common base 9 feet square and tied together on inside width and length to secure alignment of the same. They also have a large bracket at the back which slides upon back column of standard and a clamping device at end of

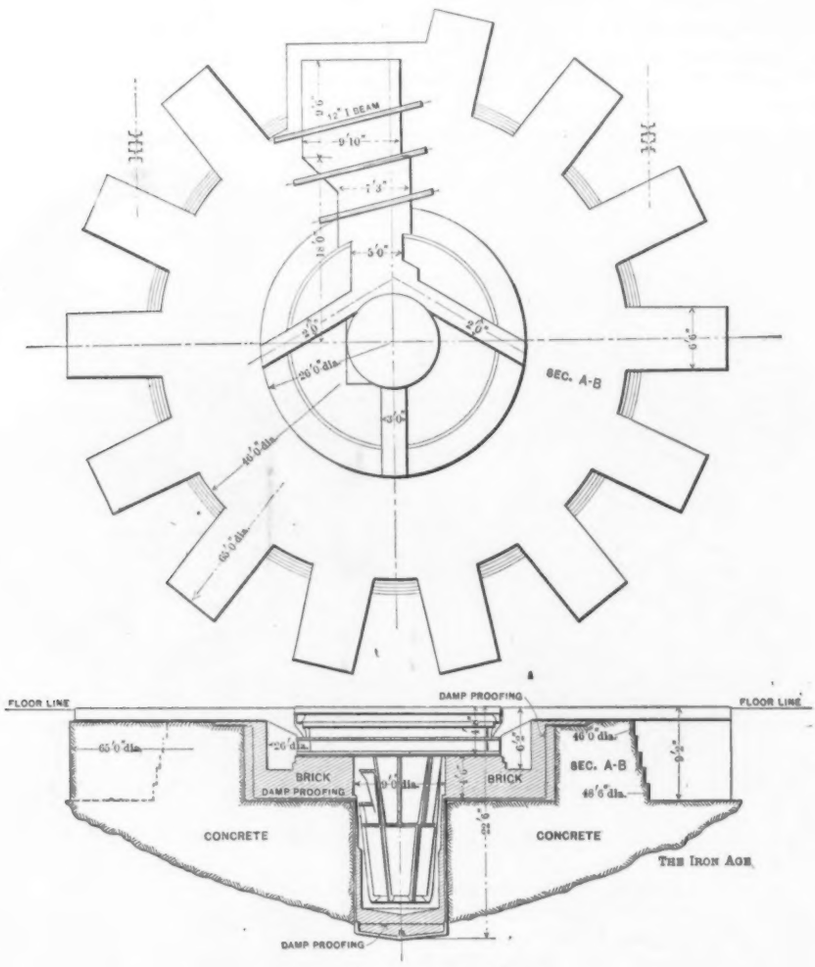


Fig. 5.—Plan of Foundation.

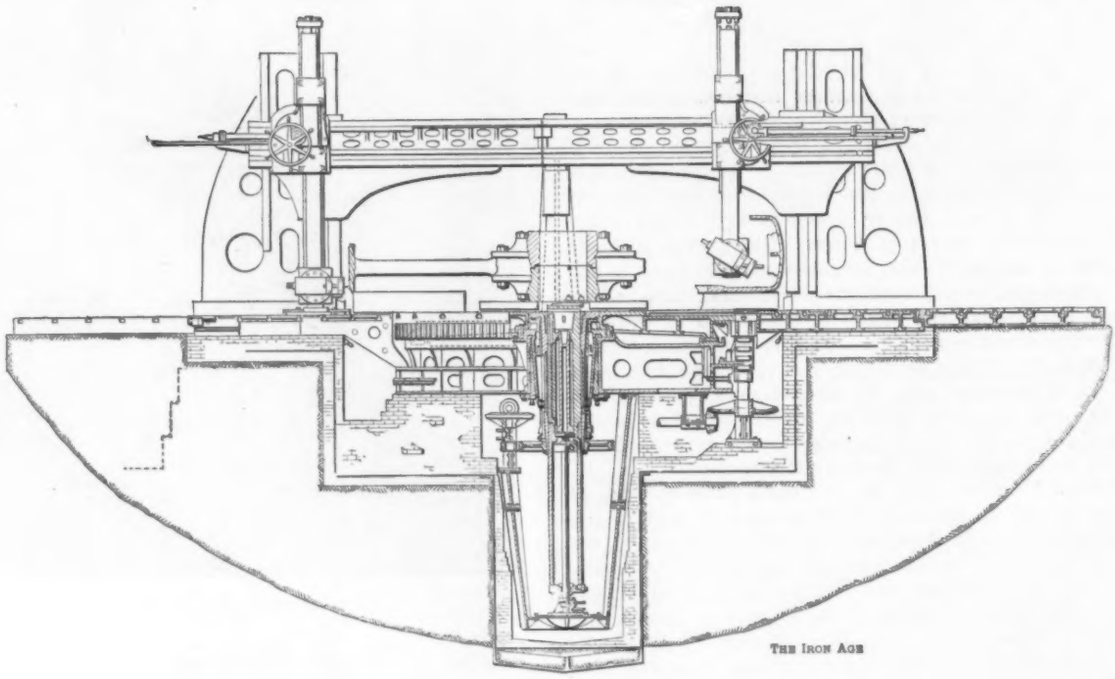


Fig. 6.—Vertical Section.

A 60-FOOT VERTICAL BORING AND TURNING MILL.

near the top by a very strong brace. The arm or cross rail, Fig. 8, which has a vertical adjustment on standards, has bearings and gibs between rail and housings of ample rail which passes across the face of housing, both of which when secured serve to prevent springing of the rail during operation. Additional support is given to rails

where they join at the center by means of a stationary stand and bracket extending out to and against the rail, as shown in plan of mill, Fig. 7, these rails being of sufficient length to enable a minimum diameter of 12 inches and a maximum diameter of 28 feet being bored and turned without moving the housings.

The design of cross rail is peculiar in construction in having the lower face project 3½ inches beyond the upper part; this lower face is 12 inches wide vertically and forms the main horizontal guide for saddle, one advantage being a double bearing to sustain the weight, the principal object being, however, greater accuracy and less liability for the saddle to oscillate, owing to the proportions of length to width of bearing, which is 12 x 42 inches, the usual proportions of large boring mill saddles being about square. We still retain the great width of rail to counteract the tool action.

Movement or feed of saddles along the rail is made by means of hydraulic mechanism, the piston and rod being stationary and attached to bracket on outer end of rail. The cylinder is allowed to float, carrying on inner end a pair of gears proportioned two to one, which engage in

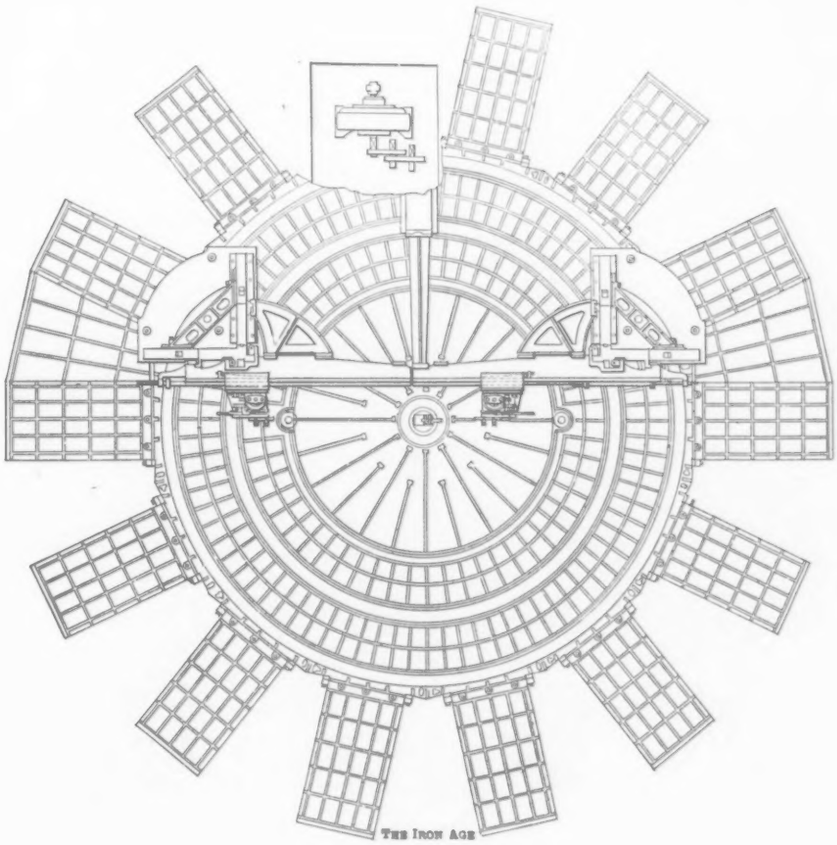


Fig. 7.—Plan.

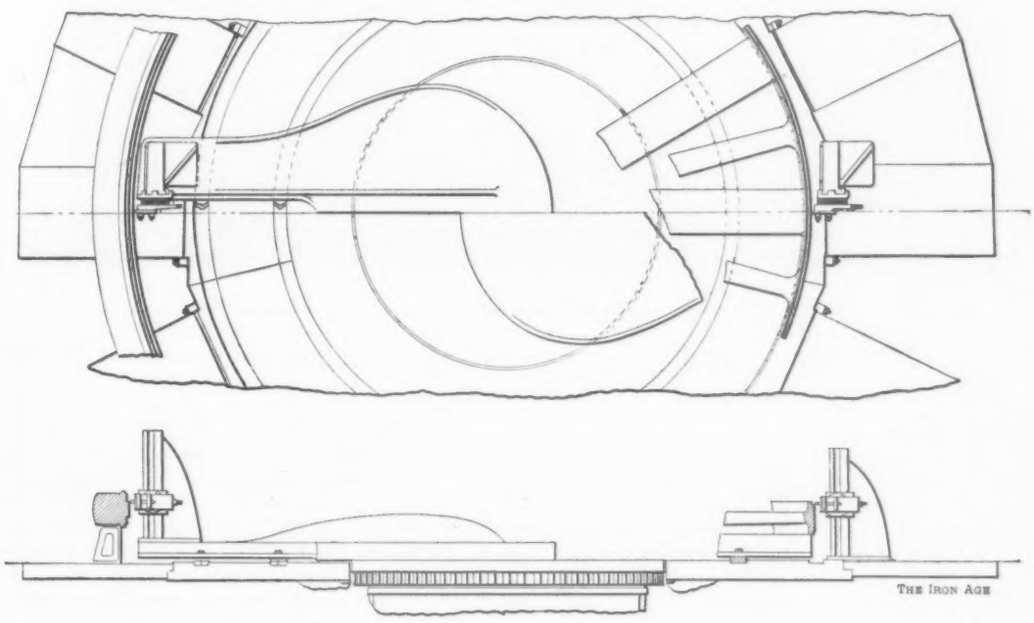


Fig. 8.—Plan for Boring and Turning Large Diameters.

A 60-FOOT VERTICAL BORING AND TURNING MILL.

two racks, the upper or stationary rack meshing with small gear, and the lower rack attached to saddle and meshing with large gear; this arrangement gives a motion of head equal to three times that of cylinder, pressure being admitted and discharged in the same manner as described in main boring bar.

The boring bar in tool heads—12 inches diameter by 15 feet long—is held in bearings on swivel plate, as on standard type of mill. This bar is bored out and fitted with a double acting piston and hollow piston rod and cross head, to which are attached two racks which serve as keys to prevent turning of bar and also for raising or lowering of bar or tool heads. The bar can be held in position as in standard mills, or can be lowered and clamped to floor when turning a piece of work. (See vertical section of boring mill, left hand bar, Fig. 6.)

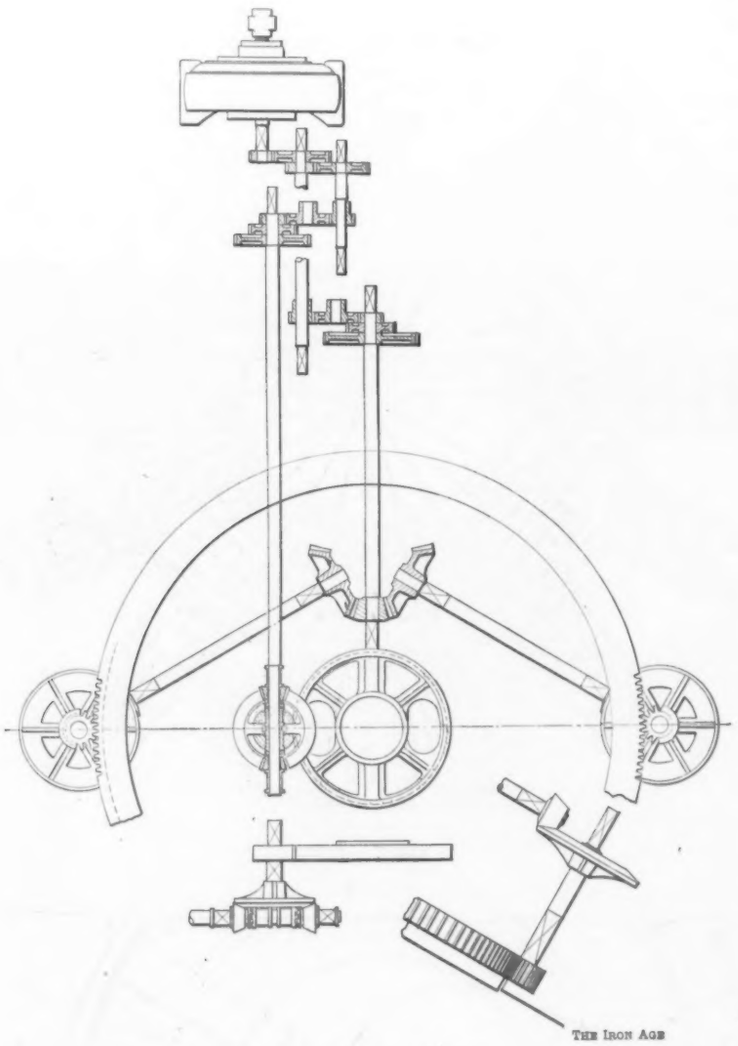


Fig. 9.—Plan of Drive.

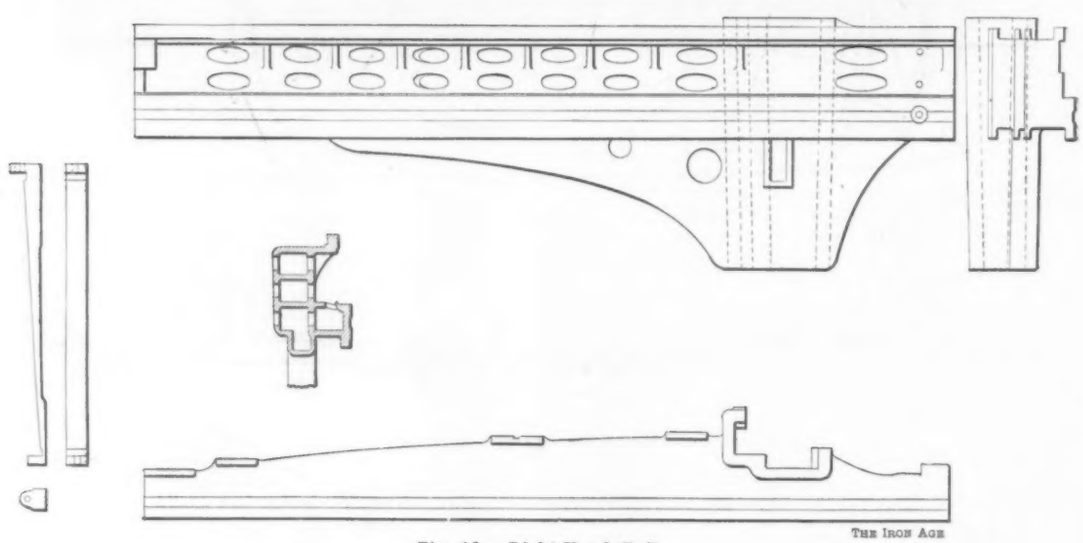


Fig. 10.—Right-Hand Rail.

A 60-FOOT VERTICAL BORING AND TURNING MILL.

The tool head is also provided with suitable device for raising or lowering bar by hand.

The tool head on bar consists of a cross slide and swivel attachment, capable of being revolved around the bar by means of worm and wheel, and moved vertically along the bar by means of the two racks above mentioned.

The housings are supported by the stationary table and floor plates extending from the table to a diameter of 65 feet, being free to travel from a position close to table to outside diameter of plates, in which position they are capable of boring or turning work of a maximum diameter of 60 feet. Housing rails, &c., weigh 155,580 pounds.

The power for driving this mill is obtained from a 50 horse-power variable speed motor. This motor has a range of speeds of from 128 to 512 revolutions per minute inclusive, power being transmitted from pinion on armature shaft through train of gears to main driving shaft. Upon main driving shaft, Figs. 9 and 11, is bevel pinion which meshes into two bevel gears on two shafts placed diagonally, upon other end of which are two bevel pinions meshing in two large bevel gears, mounted upon vertical shafts, upon which are the two pinions for driving table gear. Motor is controlled by means of a portable controller, which can be carried to any point about the mill convenient for the operator.

Net total weight of boring mill complete is 885,620 pounds.

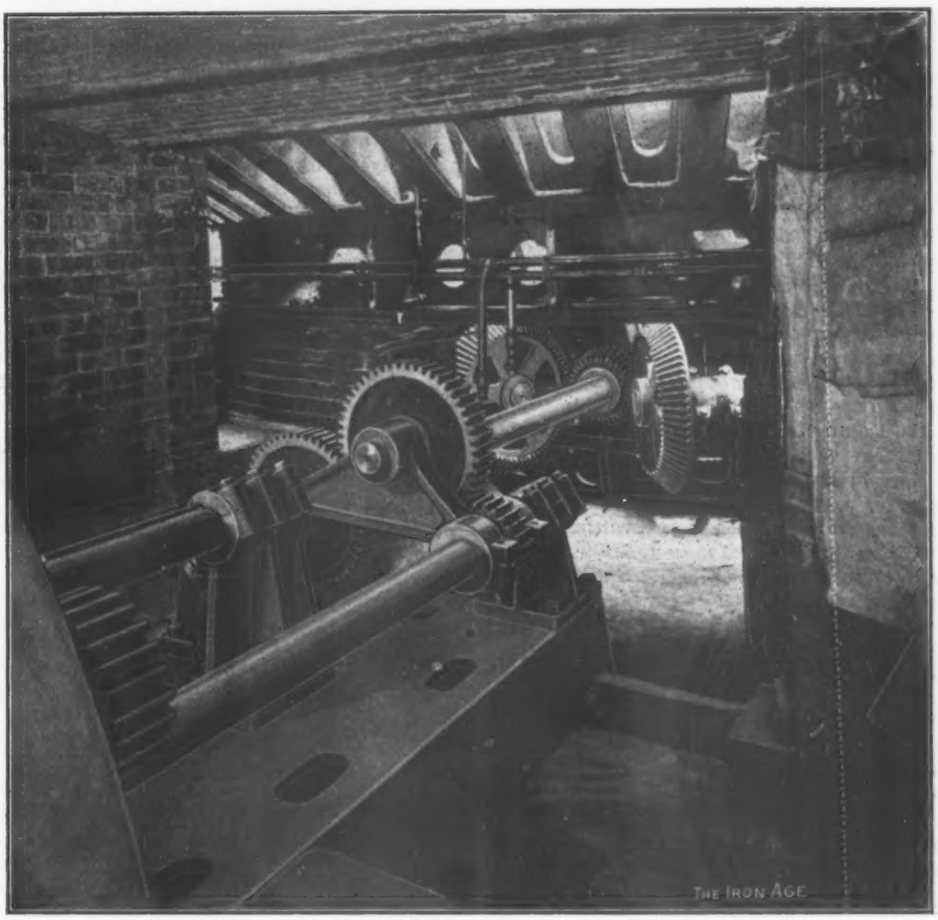


Fig. 11.—*Driving Gear.*

A 60-FOOT VERTICAL BORING AND TURNING MILL.

Vessel Contracts Awarded by the Army.—A contract was awarded by the Quartermaster-General of the Army at New York, on June 25, to Neafie & Levy of Philadelphia, Pa., for the construction of four submarine double-bottom boats, to be used in the defense of New York harbor, and by the School of Submarine Defense at Fort Totten. The contract price was $122,000 each. Contracts were awarded also to the Maryland Steel Company of Baltimore for the construction of a single screw harbor defense transport for use in New York harbor, at $88,000, and to the Risden Iron Works of San Francisco for constructing a quartermaster's supply transport vessel for San Francisco harbor, at $110,000.

Patentees Should Not Be Their Own Lawyers.

A curious fact in connection with the assignment and use of patents is that parties interested generally undertake to settle or arrange transfers upon their own conclusions as to their legal rights and privileges in the premises without the slightest knowledge of what they own or are transferring. Also, having agreed to one set of conditions, either party to the agreement or contract introduces modifications and changes from time to time, as they may occur, after the fact of such transfer, the result being confusion worse confounded if such cases ever come into court. They usually do, for disputes arise as to emoluments which can only be settled in court by those who know what the law is. It would occur to most persons of ordinary prudence in business affairs that the best way to avoid complications of the kind above mentioned would be to put the matter in the hands of attorneys in the first instance, leaving out all guess work and assumptions. The *Scientific American* of June 27 reports a case of the kind alluded to, wherein it appears that an employee of a certain concern invented an appliance which was used in its business and of which a number were sold by the makers. Thereafter the employee applied for a patent and obtained one. A question then arose as to what compensation the employee should receive for the use of it. A settlement of this kind was made: The employee was given a paper signed by the manufacturers which agreed that a certain salary should be given him for ten years, provision being made for an

increase of said salary at certain periods, whereupon the inventor orally assigned the patent to the manufacturers. He subsequently claimed that the paper covered an agreement to employ him for ten years, which assertion was denied by the manufacturers, and the case went to court, the judge deciding against the inventor; thereafter he left the service of the manufacturers and refused to continue the oral assignment. The court held that by reason of the contract the manufacturers became the owners of the patent, and the inventor, having refused to perform his part, could not bring a suit for infringement, which he would have maintained if he had performed his part. All of this expense, delay and annoyance could have been avoided by consulting the proper persons at the outset.

Railroad Problems.

The address of Geo. W. West, president of the American Railway Master Mechanics' Association, delivered at the thirty-sixth annual convention of that society, held in Saratoga, N. Y., last week, was an interesting discussion of problems with which the railroads are struggling. Mr. West is connected with the motive power department of the New York, Ontario & Western Railroad Company. He said, in part:

Cause of Recent Traffic Congestion.

The press of the country has tried to persuade the public that the trouble was with the motive power departments, or a lack of motive power or equipment; as a fact, it was because nearly, if not quite all, the trunk lines lacked terminal facilities. It was no uncommon thing during the winter to see miles and miles of trains, with the engine of the following trains within coupling distance of the leading train waiting for orders to move, and instances have been cited to me of train crews reporting for duty immediately on arrival of train at destination ready for work, having had the required amount of rest on the trip while sidetracked or awaiting orders.

These conditions have proved more forcibly than could any committee of our association, had it continued its investigations of the cost of running high speed trains, that the number of factors entering into the problem make it an unknown quantity, depending entirely on how much other traffic is delayed in keeping high speed trains on time, and unless they are kept on time it is no credit to the system attempting it.

The per diem system of handling freight equipment demonstrated to many roads that it is wiser and better to look after the movement of cars they owned than to build additional ones. The same rule if applied to their locomotives would give equally surprising results.

Efficiency of Equipment.

The various coal roads carried 23,120,238 tons less coal during the strike period than they did during corresponding months in 1901; and men well up in knowledge of the fuel situation prophesied it would take two years at least to meet the requirements due to the shortage. In fewer than three months from the time of settlement we find the demand supplied and the storage of coal begun. It has proved what can be accomplished with our modern equipment when necessary.

The several roads moved in the first four months following the settlement 5,624,828 tons in excess of any previous corresponding period. The Ontario & Western, for example, moved 58,360 tons more coal in the three months following the strike settlement than ever before in the same period, with only two additional locomotives.

The anthracite strike enabled the bituminous coal companies to obtain a much higher price for their fuel and the result has been that the cost of fuel to operate our locomotives has been very materially increased. It is strange that notwithstanding this one item of expense on many roads equals the cost of repairs and wages of enginemen combined, it is given the least attention of anything entering into the performance sheet figures.

The wide fire box engines lose a large percentage of their savings and other advantages in the extra coal used in cleaning fires and that consumed while held on side tracks and at terminals. Undoubtedly any road having 100 locomotives in service can well afford to employ one man to every 100 miles of road to give this loss of fuel his entire attention.

There seems to be a great diversity of opinion regarding the advantage or efficiency of the piston valve, and from all that can be learned the engine failures are not reduced on lines using them. In this connection, have we not for the last few years paid too little attention to the one important factor in successful railroading, "engine failures"—little things that affect the public and are seldom talked about in our meetings? There is hardly a day that some man is not half an hour late, whose explanation is that the engine broke down.

In my opinion, it will hold true on nearly all roads that 20 per cent. of the engine failures represent 80 per cent. of the cost, while the other 80 per cent. of failures represent only about 20 per cent. of the money damage, but represent a large proportion of perplexing delays. Many of these can be attributed to poor inspection, others to defects attending the high boiler pressure, such as broken water and lubricator glasses, &c., while a few are due to patent sanders.

Air Brakes.

Men connected with mountain roads, as I have been nearly all my life, will welcome the effort that is being made to meet the one serious defect in the automatic air brake—viz.: Liability of heavy freight trains, getting beyond control of the engineer, descending long grades while train is being recharged. The Westinghouse people have an attachment connected with the engine that serves a valuable purpose in connection with the automatic brake, as it relieves the friction from the locomotive tire while other brakes are in service, thus allowing the tire to remain cool and tight on wheel center and better adapted to check the speed of train when brakes are applied, which is only during the time train brakes are released while auxiliaries are being recharged.

Recent tests in stopping high speed trains have demonstrated that the braking power of any metal used for breaking diminishes as the heat increases, and we have found that engines equipped with the device referred to will hold trains down to the same speed, during all the time the brakes are being recharged, that had been attained at the time necessary to recharge.

Considerable progress has been made in the application of high speed brakes, and both our brake companies have demonstrated that even more can be expected of the automatic brake than we have been getting in its power to stop quick moving trains. The two companies are working on entirely different lines to accomplish the same result, and it is to the interests of all the railroads that they lend all the assistance at their command to enable the brake companies to give us the best brake possible at the least expense or change. This is certainly a high speed age and only they that can attain it are in the race.

In the English Channel on June 27 the new turbine steamboat, the "Queen," made her final trial trip before being placed in commission. The average speed was upward of 23 knots. Expressions of satisfaction were general. The vessel afterward took her place on the regular schedule from Dover to Calais in connection with the London-Paris service. Persons who were on board on her trial trip predicted a turbine Atlantic liner within two or three years. C. A. Parsons, the inventor of the turbine marine engine, is confident he can clip a full knot off the best Transatlantic speed record whenever he shall have a chance to make a test of his invention on so large a scale.

The danger of experimenting with substances the nature of which is not fully known was shown in a foundry recently, when two men who were drawing off liquid asphalt from a barrel, finding it did not flow as freely as they desired, undertook to hasten operations by plunging a red hot iron into the orifice. The asphalt immediately exploded with disastrous effects, doing great damage and seriously injuring several persons. Asphalt is said to be liquefied by the use of naphtha, so red hot irons are inadmissible in connection with it.

increase of said salary at certain periods, whereupon the inventor orally assigned the patent to the manufacturers. He subsequently claimed that the paper covered an agreement to employ him for ten years, which assertion was denied by the manufacturers, and the case went to court, the judge deciding against the inventor; thereafter he left the service of the manufacturers and refused to continue the oral assignment. The court held that by reason of the contract the manufacturers became the owners of the patent, and the inventor, having refused to perform his part, could not bring a suit for infringement, which he would have maintained if he had performed his part. All of this expense, delay and annoyance could have been avoided by consulting the proper persons at the outset.

Railroad Problems.

The address of Geo. W. West, president of the American Railway Master Mechanics' Association, delivered at the thirty-sixth annual convention of that society, held in Saratoga, N. Y., last week, was an interesting discussion of problems with which the railroads are struggling. Mr. West is connected with the motive power department of the New York, Ontario & Western Railroad Company. He said, in part:

Cause of Recent Traffic Congestion.

The press of the country has tried to persuade the public that the trouble was with the motive power departments, or a lack of motive power or equipment; as a fact, it was because nearly, if not quite all, the trunk lines lacked terminal facilities. It was no uncommon thing during the winter to see miles and miles of trains, with the engine of the following trains within coupling distance of the leading train waiting for orders to move, and instances have been cited to me of train crews reporting for duty immediately on arrival of train at destination ready for work, having had the required amount of rest on the trip while sidetracked or awaiting orders.

These conditions have proved more forcibly than could any committee of our association, had it continued its investigations of the cost of running high speed trains, that the number of factors entering into the problem make it an unknown quantity, depending entirely on how much other traffic is delayed in keeping high speed trains on time, and unless they are kept on time it is no credit to the system attempting it.

The per diem system of handling freight equipment demonstrated to many roads that it is wiser and better to look after the movement of cars they owned than to build additional ones. The same rule if applied to their locomotives would give equally surprising results.

Efficiency of Equipment.

The various coal roads carried 23,120,238 tons less coal during the strike period than they did during corresponding months in 1901; and men well up in knowledge of the fuel situation prophesied it would take two years at least to meet the requirements due to the shortage. In fewer than three months from the time of settlement we find the demand supplied and the storage of coal begun. It has proved what can be accomplished with our modern equipment when necessary.

The several roads moved in the first four months following the settlement 5,624,828 tons in excess of any previous corresponding period. The Ontario & Western, for example, moved 58,360 tons more coal in the three months following the strike settlement than ever before in the same period, with only two additional locomotives.

The anthracite strike enabled the bituminous coal companies to obtain a much higher price for their fuel and the result has been that the cost of fuel to operate our locomotives has been very materially increased. It is strange that notwithstanding this one item of expense on many roads equals the cost of repairs and wages of enginemen combined, it is given the least attention of anything entering into the performance sheet figures.

The wide fire box engines lose a large percentage of their savings and other advantages in the extra coal used in cleaning fires and that consumed while held on side tracks and at terminals. Undoubtedly any road having 100 locomotives in service can well afford to employ one man to every 100 miles of road to give this loss of fuel his entire attention.

There seems to be a great diversity of opinion regarding the advantage or efficiency of the piston valve, and from all that can be learned the engine failures are not reduced on lines using them. In this connection, have we not for the last few years paid too little attention to the one important factor in successful railroading, "engine failures"—little things that affect the public and are seldom talked about in our meetings? There is hardly a day that some man is not half an hour late, whose explanation is that the engine broke down.

In my opinion, it will hold true on nearly all roads that 20 per cent. of the engine failures represent 80 per cent. of the cost, while the other 80 per cent. of failures represent only about 20 per cent. of the money damage, but represent a large proportion of perplexing delays. Many of these can be attributed to poor inspection, others to defects attending the high boiler pressure, such as broken water and lubricator glasses, &c., while a few are due to patent sanders.

Air Brakes.

Men connected with mountain roads, as I have been nearly all my life, will welcome the effort that is being made to meet the one serious defect in the automatic air brake—viz.: Liability of heavy freight trains, getting beyond control of the engineer, descending long grades while train is being recharged. The Westinghouse people have an attachment connected with the engine that serves a valuable purpose in connection with the automatic brake, as it relieves the friction from the locomotive tire while other brakes are in service, thus allowing the tire to remain cool and tight on wheel center and better adapted to check the speed of train when brakes are applied, which is only during the time train brakes are released while auxiliaries are being recharged.

Recent tests in stopping high speed trains have demonstrated that the braking power of any metal used for breaking diminishes as the heat increases, and we have found that engines equipped with the device referred to will hold trains down to the same speed, during all the time the brakes are being recharged, that had been attained at the time necessary to recharge.

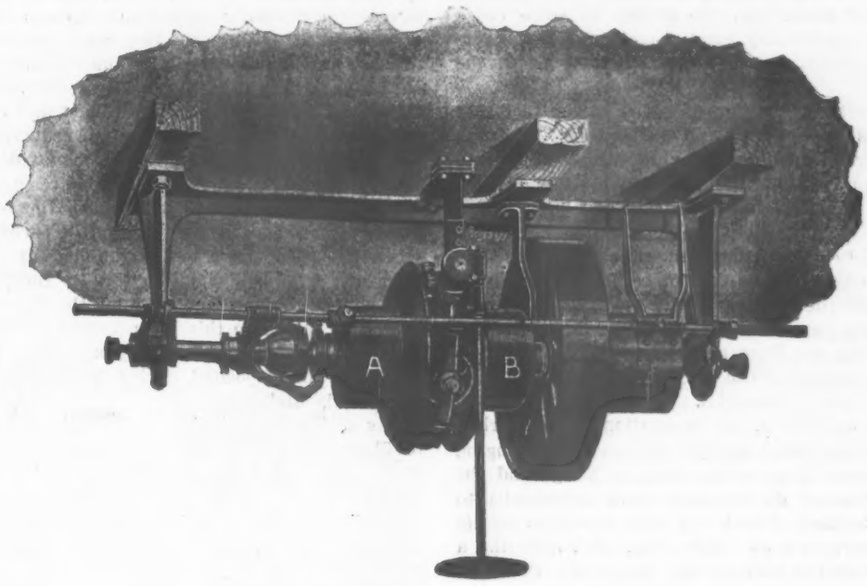
Considerable progress has been made in the application of high speed brakes, and both our brake companies have demonstrated that even more can be expected of the automatic brake than we have been getting in its power to stop quick moving trains. The two companies are working on entirely different lines to accomplish the same result, and it is to the interests of all the railroads that they lend all the assistance at their command to enable the brake companies to give us the best brake possible at the least expense or change. This is certainly a high speed age and only they that can attain it are in the race.

In the English Channel on June 27 the new turbine steamboat, the "Queen," made her final trial trip before being placed in commission. The average speed was upward of 23 knots. Expressions of satisfaction were general. The vessel afterward took her place on the regular schedule from Dover to Calais in connection with the London-Paris service. Persons who were on board on her trial trip predicted a turbine Atlantic liner within two or three years. C. A. Parsons, the inventor of the turbine marine engine, is confident he can clip a full knot off the best Transatlantic speed record whenever he shall have a chance to make a test of his invention on so large a scale.

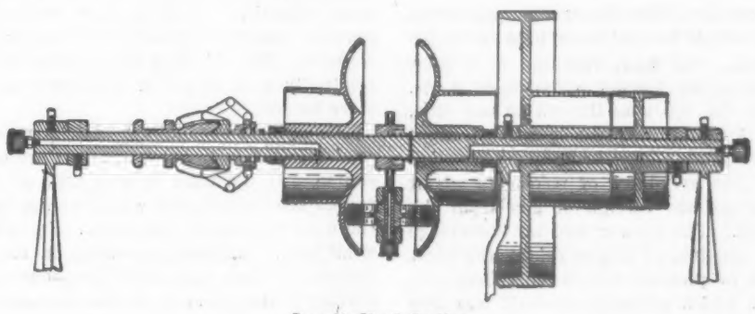
The danger of experimenting with substances the nature of which is not fully known was shown in a foundry recently, when two men who were drawing off liquid asphalt from a barrel, finding it did not flow as freely as they desired, undertook to hasten operations by plunging a red hot iron into the orifice. The asphalt immediately exploded with disastrous effects, doing great damage and seriously injuring several persons. Asphalt is said to be liquefied by the use of naphtha, so red hot irons are inadmissible in connection with it.

Speed Changing Planer Countershaft.

The Speed Changing Pulley Company of Indianapolis, Ind., have designed the speed changing planer countershaft here illustrated. The shaft does not revolve but is held stationary by set screws in the hangers. The large, or backing, pulley runs loose on the shaft and is driven by a belt from the line shaft. The forward drive also runs loose on the shaft and is driven by a belt from the line shaft to pulley A, which, through the three transmitters shown in the sectional view, drives the pulley B, which moves the planer forward. The countershaft is started or stopped by the ordinary shifter, which shifts the belt at one end and compresses or releases a spring at the other end, thereby shifting the belt to or from the loose pulley and making pulley A tight or loose. Only the speed of the forward drive is changed. This is done by a hand wheel, six turns of which give a range of 7 to 1, or any intermediate speeds. All running parts are lubricated by compression grease cups through hollow shafts.



Countershaft Secured to Ceiling.



Longitudinal Section.

SPEED CHANGING PLANER COUNTERSHAFT.

The Clearfield Steel & Iron Company.—The works of the Clearfield Steel & Iron Company, a corporation chartered under the laws of Pennsylvania, were formally turned over, during the past week, to the officers of the company by Hyde Brothers & Co. of Pittsburgh, Pa., who designed, built and put the plant in operation. The plant is of modern design and well equipped throughout for the production of muck bar, chain iron, bolt and rivet iron, skelp and light iron and steel rails for lumber and mining purposes. The buildings, which are of steel throughout, cover a floor space of over 73,000 square feet, the main building being 34 feet high and equipped with a 15-ton electric traveling crane for changing rolls, &c. Practically all the steam power required is derived from the waste heat from the puddling and heating furnaces, there being nine waste heat boilers, aggregating 1200 horse-power, attached to different furnaces. The company have their own mines, of low sulphur coal, within ½ mile of the plant, which is well situated on the banks of the Susquehanna River for an ample supply of pure water. The works are situated on the line of the B. R. & P. Ry., about 2 miles from Clearfield, and have switching arrangements to the P. R. R. and New York Central. The capacity of the plant, when running full, will be about 50,000 tons per annum of iron and steel. The capital stock of the company is $750,000, all of which is subscribed for, with the exception of a small amount of treasury stock, and the list of stockholders includes some of the leading bankers and business men of Pittsburgh, New York, Rochester and Clearfield. The Pittsburgh offices of the company are in the German National Bank Building, corner Wood street and Sixth avenue.

Actual boring for the Pennsylvania Railroad Company's Hudson River tunnel was begun June 25, when a large force of men began digging for the shafts to the headings at Thirty-second street and Eleventh avenue, New York City. Work will shortly begin at the western end of the tunnel in Jersey City. This will be the largest piece of engineering and construction work ever undertaken by private interests.

The Cause of Some Blast Furnace Explosions.

During the last few years furnace explosions following "hanging" seem to have been very frequent on the continent of Europe, and it has become a pressing question to ascertain their exact cause as the first step towards finding a remedy. At the annual meeting of the Verein Deutscher Eisenhuettenleute, held April 26 in Duesseldorf, a paper read by Director Schilling, a blast furnaceman of many years' experience, formed an interesting contribution to the subject. After giving details of various explosions of this class, showing the conditions existing when they took place, and the havoc, in some cases amounting to a practically total demolition of the furnace, caused thereby, he developed his view as to the cause.

The theory set up by Osann is based on the fact that at temperatures between 400 and 500 degrees C. carbon monoxide, in presence of ferric oxide, disassociates into carbonic acid and carbon, the latter in a finely divided condition completely enveloping the ore, and later, acting on the oxides, causing a very rapid reduction. Schilling is not prepared to believe that hanging can be caused in this manner because, in the first place, if the furnace is not working right the material moves too rapidly through the zone of this particular temperature, and secondly, carbon separating out from gas is too finely divided to allow it, while exposed to the stream of gas, to adhere to the continually shifting material. He believes that Osann confuses cause and effect, the separation of the carbon from the monoxide being always the result of hanging and not the cause. Not until a furnace hangs and the material is stationary do the gases have opportunity to undergo this reaction, but when that condition exists finely divided ore, such as "blue billy," &c., acts like a filter and no doubt the finer the ore the greater the separation of carbon. As a result the temperature rises, the same reaction is repeated higher up and a large mass of material is soon impregnated with finely divided carbon which, if a slip now takes place, drops into a lower and hotter zone, is shaken off the ore and, by reason of its condition, rapidly attains the temperature prevailing in its new position. Here the gases also have a higher temperature, and the carbon mixing them disassociates the carbonic acid, forming the monoxide according to the formula $CO_2 + C = CO$. One volume CO_2 suddenly forming two volumes CO is the simple reaction which causes the explosion, a solid body being transformed suddenly into a gaseous state.

As evidence of the truth of his theory the speaker instanced an explosion which he had been able to watch from beginning to end. He was watching a furnace and noticed coming from the bleeder a hydrogen flame. Suddenly the valve at the top was thrown to one side, and with a roar a black column 100 feet or more in hight rose into the air, which gradually clearing away was followed from time to time by pieces of coke. In about two and one-half minutes the stream of gas from the furnace became normal. The blower had no knowledge that the furnace was hanging, as it was taking the blast as usual. The furnace in question was making Bessemer iron with a burden of which probably one-half was fine ore.

Another instance was that of a furnace which had been idle for 15 hours and of which, although it took the blast well when the latter was turned on, the contents remained hanging and could not be made to drop by repeated stoppages of the engines. After blowing for about two hours the furnace was laid idle for about ten minutes. Suddenly out of the central tube rose a black cloud of such density that from below nothing could be seen of the charging platform. Scarcely had this stopped after lasting for about a minute than it was repeated, and large and small pieces of coke were at the same time thrown out of the furnace. Owing to the valve not being quite tight, a certain amount of blast was going into the furnace all the time, besides which the limestone yielded 20 kg. of carbonic acid per minute.

A similar explosion which took place at Seraing after the furnace had been standing idle for about eight hours was accompanied by more material damage than at the last mentioned example. The speaker remarked that before he had heard of this occurrence it was his belief that by immediately stopping the blast after a slip such accidents could be prevented, the finely divided carbon being removed by very gentle blowing, but two explosions taking place in furnaces which were idle proved that this assumption was not correct.

Both in the case at Seraing and in the previously mentioned one a real "hang" did not occur, as a hanging furnace will take little if any blast, and it is necessary by some means or other to form hollow spaces in order to give the burden a chance to drop and thus allow the gas a free passage. In the two cases mentioned, however, the slag was running normally and the gases were coming out of the furnace in the usual amount, evidences that there was no obstruction to the blast and that the material was not hanging in the zone of reduction but in that part of the furnace where carbon monoxide disassociates into carbon and the dioxide. By this reaction, giving rise to a very large increase in volume, the burden is held firmly pressed against the walls of the furnace (especially when the latter have but slight conicity) and remains hanging. The hollow space formed thereby lies below that part of the burden containing the fine carbon, and, if the latter falls into this incandescent space, the reaction of C and CO_2 takes place immediately. A slip having occurred, the deposited carbon causes the material to hang again higher up.

As an instance of what an incredible amount of finely divided carbon is formed, the speaker mentioned a case in his own experience of a furnace which first hung for ten hours, then slipped and then hung again. After working badly for five days it began to take more blast, but the material dropped only when the blast was shut off, which was done every quarter of an hour. As the passage became more open each stoppage of the blast caused a thick black cloud of carbon to be blown out of the explosion door, and this took place for every quarter of an hour for 30 hours.

To show that this fine carbon is capable of causing a hanging in the upper part of the stack, he related an instance of a furnace running on ferromanganese which, owing to a renewal of the central tube, was idle for 16 hours. The furnace, which was full to the top, had first hung for two hours below, and when this had fallen and the slag was again running normally it still remained hanging at the top. By loosening up the central tube one-half the periphery was induced to drop, giving rise to large quantities of black dust, while the other half remained hanging although only supported at the circumference. By swinging the central tube this also was gradually brought down, whereby continual black clouds were formed.

Hanging in the upper part of a furnace is only dangerous when things in the lower part are taking their normal course. If the blast is still kept on large incandescent spaces are formed, and when the burden falls into one of these an explosion takes place. In order to prevent this Schilling recommends openings in the stack at various hights, by means of which the space and the arch supporting it can be located and the latter broken down by means of explosives, a remedy both safe and effective if used in time.

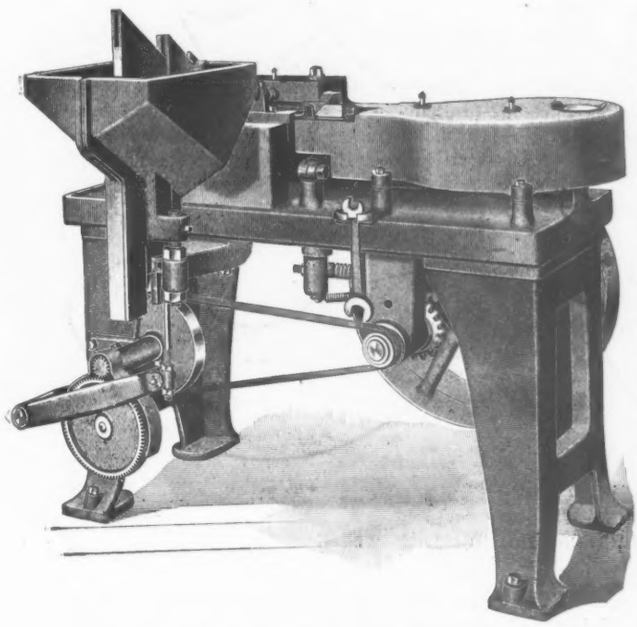
The American Steel Hoop Company, now operated under the name of Carnegie Steel Company, have signed the Amalgamated scale for the hoop mills operated by that concern and for which the scale is signed. This last settlement concludes the wage scales for all the concerns controlled by the United States Steel Corporation, and all of which are effective from July 1 next.

The South Chicago plant of the Illinois Steel Company on June 25 turned out 1894 tons of steel rails, breaking the world's record, which had been 1772 tons for a day's work. In celebration of the successful day the company presented every man in the rail department with a box of cigars.

Automatic Rolling Machines for Threading Screws.

As a resident of "Yankee" land, the writer was much surprised, on visiting the South Kensington Museum in London recently, to see on exhibition a thread rolling machine having flat dies, one stationary and one reciprocating; in fact, made on general principles just as they are built to-day. This was not a model, but a full size, practical working machine, dated 1851. This far antedates any of the many American claimants to this rapid process for screw threading; another example of the "Ancients stealing our inventions." Just why threading screws by this means is not common in England we cannot discover, but we do know that for some years now it has been successfully employed and is growing in favor in this country.

It is possible that the "mystery" of making the dies has deterred many from adopting this machinery, but it need no longer be a matter of "cut and try," as tables or data can be readily obtained which will enable one to arrive quickly at the exact size of wire required to produce a certain diameter of screw. The angle of the



AUTOMATIC ROLLING MACHINE FOR THREADING SCREWS.

grooves on the face of the dies is also easily determined by a few simple figures. With a rigid machine and properly made dies the work produced is far superior to much of the common screw work cut with dies; in fact, we know of taps now being made by this process.

The machine illustrated represents one of the best type now built for this class of work and is the product of the E. J. Manville Machine Company of Waterbury, Conn. A substantial vertical shaft in the frame carries on its upper end a large gear, in the upper surface of which is a crank pin, which by means of the connecting rod gives the reciprocating action to the moving die slide. With the rim of this gear engages a steel pinion, also on the upper end of a vertical shaft. This pinion shaft is operated from the lower horizontal belt driven shaft by means of heavy bevel gears. On the lower end of the crankshaft is an adjustable cam, by which the "pusher" that starts the work into the bite of the dies is made to act at the proper instant. As soon as a blank is started between the dies another may be placed at once without waiting for the die slide to return, and this of course greatly facilitates feeding by hand.

The reciprocating slide carrying the moving die has a very broad and long bearing surface against the frame, opposite the point of pressure, and special oiling devices are provided, so that very little of the driving power is wasted in frictional resistance. Another point gained by driving the slide with a horizontal crank is that all of the pressure or strain on the slide is in one direction—that is, there is no up or down or rocking motion, the pressure being against the back surface, since the direction of rotation of the crank forces it back while threading the blank and also draws it toward the back when returning for another.

The problem of producing an automatic feed for this class of machine, which would handle the large variety of headed screws which may be passed through such a machine, has been no easy one, and while automatic feeds are in many cases employed they are generally adapted to some special job, as, for instance, one size of tire bolt or stove screw.

The machine illustrated shows a successful solution of the universal feature so desirable for general work. It is also very positive and sure in action, and by an ingenious construction of the separating device prevents clogging and breakage, as only one blank can get in front of the starter at a time. The hopper is of the plunger type and is well adapted to handling blanks having the various shapes of heads common to small machine screws

G.

The Colorado Fuel & Iron Company.

An unexpected change occurred in the management of the Colorado Fuel & Iron Company on Wednesday, June 24. At a meeting of the Board of Directors, held in this city, John C. Osgood resigned from the board, of which he had been chairman for many years. John L. Jerome and A. C. Cass of Denver also resigned from the directorate. Mr. Cass had been a member of the Executive Committee. Three representatives of the Rockefeller interests were elected to fill the vacancies. They are John D. Rockefeller, Jr., F. T. Gates and E. Parmelee Prentice. The last named is a son-in-law of John D. Rockefeller, and Mr. Gates is one of Mr. Rockefeller's closest business associates. J. H. McClement was elected chairman of the Board of Directors, succeeding Mr. Osgood. In an official statement, issued on the same day, it is said that Mr. McClement will represent the Rockefeller-Gould interests. The vacancies on the Executive Committee were filled by the election of F. T. Gates and John D. Rockefeller, Jr. The Board of Directors is now made up as follows: George P. Butler, John D. Rockefeller, Jr., E. Parmelee Prentice, F. T. Gates, George J. Gould, Benjamin Nicoll, James H. Hyde, E. H. Harriman, Edwin Hawley, H. E. Huntington, Frank Trumbull, J. A. Kebler and J. H. McClement. Mr. Trumbull is president of the Colorado & Southern and Benjamin Nicoll is a close friend of George J. Gould. The Rockefeller-Gould interests have a clear majority on the board.

The official statement issued after the meeting says, in part:

"The temporary difficulty in the company's meeting its paper on the 15th inst., was thoroughly investigated by the board. As a result of this investigation the board adopted resolutions exonerating the officers and clerks from all blame, as the failure was clearly due to a misunderstanding between the New York and Denver office.

"On account of the absence in Europe of three of the Eastern directors and the necessity at the present time for Mr. Osgood to be in the West, it was necessary for him to retire temporarily from the board and Executive Committee, in order to have a New York resident take his place, so as to provide a quorum for meetings held in New York. The other Colorado directors have retired in order to make places for representatives of the new financial interests. It is expected by all parties concerned that Mr. Osgood will return to the board and to the Executive Committee at the next annual election."

Some comment is made in iron circles on the fact that John D. Rockefeller and his close business associates not only control the Colorado Fuel & Iron Company but are also heavily interested in the United States Steel Corporation.

At New Orleans, on June 25, in the presence of a large assemblage, Mayor Capdevielle turned the first spade of earth in the work of constructing a vast system of sewage, water supply and drainage which is to cost $18,000,000.

American Society of Mechanical Engineers.

Saratoga Convention.

A paper presented at the Wednesday morning session was by John L. Bacon on

Some Data on Hoisting Hooks,

from which we take the following:

The following are some results obtained from experiments which had in view a comparison of the strengths of hooks bent out of round stock and hooks shaped according to Towne's formula, and also the effect of case hardending, or carbonizing, upon the strength of the above hooks. No attempt was made at mathematical analysis, the object being experimental data. The general shape of the hooks tested is shown in Fig. 1. The eyes were welded, and pains were taken to have the lower curved parts of the hooks to be compared alike as near as possible.

One of the conclusions drawn from the experiments was that if the hook was properly shaped between the points A and B, Fig. 1, the shaping of the rest of the hook had very little to do with the strength, the shaping of the rest of the hook having more to do with the "hang" than the strength. Of course the critical part for strength lies at about the point C, the shape of the lower part

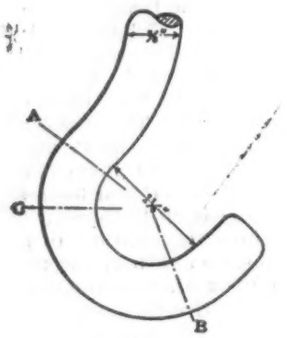


Fig. 1.

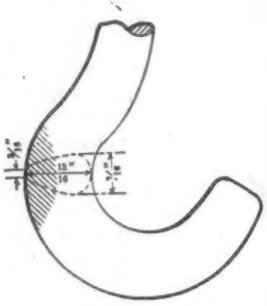


Fig. 2.

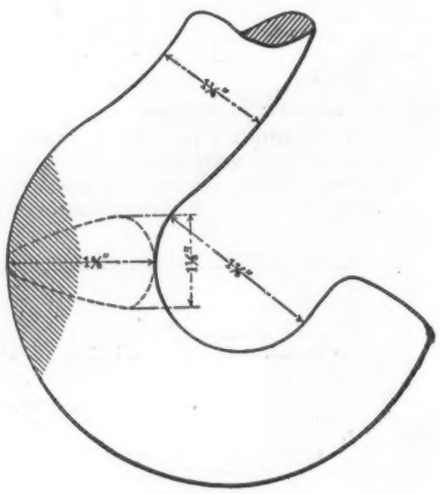


Fig. 3.

SOME DATA ON HOISTING HOOKS.

merely determining the point at which the load will be applied. All of the hooks tested failed, either by bending or breaking, at about C.

When testing, working conditions were reproduced as nearly as possible. The hook was suspended by a loop of round iron run through the eye, the ends of the loop being gripped in the upper jaws of the testing machine. A long link of round iron was put over the hook and through the lower head of the machine, and a round bar passed through the lower end of the link under the head. This arrangement left the hook free to adjust itself to the strain in all directions.

Some of the samples were case hardened or carbonized. These were heated with granulated raw bone. The ⅝-inch hooks were hot for about eight hours and the 1¼-inch hook for about nine hours. The depth of penetration of carbon, or thickness of the carbonized coating of the mild steel, was about 1-16 inch. The ⅝-inch hooks were all made from one bar of mild steel and both 1¼-inch hooks were made from one bar.

In the following table the word "carbonized" is used to designate the hooks which were treated as described above. Those marked simply "carbonized" were allowed to cool in the box in which they were heated; those marked "annealed" were afterward annealed, and the ones marked "hardened" were hardened in the usual way. Following are the more important data from the experiments:

Mark.	Kind of hook.	Size of stock. Inches.	Bend started at	Max. load. Bent.	Max. load. Broke.	T. S. of Bar.
4	Plain	⅝	2,500	3,000	....	62,150
5	Plain	⅝	2,400	3,300	....	62,150
3	Plain—Carbonized and hardened	⅝	4,000	....	4,200	62,150
1A	Plain—Carbonized and annealed	⅝	2,750	....	2,900	62,150
2A	Plain—Carbonized and annealed	⅝	2,600	3,200	....	62,150
2A	2A—Bent into shape and hardened	⅝	5,000	....	5,200	62,150
X	Carbonized and hardened —Towne's shape, Fig. 2	⅝	....	....	3,000	62,150
XX	Carbonized—Towne's shape	⅝	2,800	....	3,200	62,150
—X	Towne's shape—Untreated	⅝	3,000	3,500	....	62,150
C	Plain—Carbonized and annealed	1¼	9,000	....	13,500	....
T	Towne's shape—Untreated	1¼	6,000	13,000	....	....

All of the tested hooks were made in the shops and the testing was done in the laboratories of Lewis Institute.

Figs. 2 and 3 give the dimensions of the flattened hooks. These hooks were made to conform as nearly as practical to Towne's formula. The other hooks, bent into shape without any flattening, had the same inside curve as the flattened hooks. The flattened hooks all gave way by compressing the metal shown by the shaded area. This was easily determined, as the scale at this point cracked off and was undisturbed on the other parts.

All of the hooks which failed by bending stood a much higher load after the bend started; or, in other words, the hooks would stand a heavier load after they were partially straightened out, due probably to the fact that as the hook straightened the leverage of the load was decreased. The above data would seem to indicate that a hook made from round iron and carbonized is about as strong as the same shaped hook flattened according to Towne's formula, while a plain hook carbonized and hardened is from 40 to 50 per cent. stronger than either of the other two.

The following may prove interesting as showing that the untreated hooks stand greater strains after they start to open. The detailed report of the test on hook T was as follows: Very slight opening at 6000 pounds load; open scant 1-32 inch at 8000 pounds; strong 1-32 inch at 9000 pounds; 1-16 inch at 10,000 pounds; ⅛ inch at 11,000 pounds; would not sustain load of 12,000 pounds any length of time and opened rapidly at 13,000 pounds.

After the above test, and without disturbing the hook in the testing machine, a load of 13,000 pounds was applied. The hook carried this load without showing any signs of further opening for about 15 days. At the end of that time the load was increased and the hook straightened almost to a right angle, after which it held a load of 15,500 pounds.

Discussion.

Fred. A. Waldron, superintendent of the power plant of the Yale & Towne Mfg. Company, gave an interesting account of the experience of his concern in the use of hooks of different shapes and materials. He had found that steel hooks, both cast and forged, were unreliable.

While possessing greater tensile strength than those made of iron, they were subject to deterioration by crystallization and inherent flaws could not be detected. A very great disadvantage was that steel hooks gave way without any warning—a sudden snapping and the hook parted without any previous stretching out. Treatment by case hardening, annealing and the like only served to aggravate all defects except that due to crystallization. They had found that for reliability, durability and general all around service a drop forged hook made of high grade puddled iron was the best. Under excessive load it would straighten out and thus give warning; it had no tendency toward sudden rupture, as in the case of steel. The speaker also dwelt upon the fact that iron was less liable to injury in the fire or under the hammer than steel. They now used iron to the complete exclusion of steel, although it cost about twice as much.

A TURBINE FLOW RECORDER

was described by C. M. Allen of Worcester. This device records automatically the total quantity of water discharged by a turbine. It really makes a water meter out of the turbine, using the vanes of the turbine as the vanes of the meter, and readings are taken from the dials in the same manner as from the ordinary water meter. In other words, this device records the total quantity of water passing through a given turbine with a variable gate opening and acting under a variable load.

STRAINS PRODUCED BY EXCESSIVE TIGHTENING OF NUTS.

This was the title of a paper by A. Bement of Chicago, a part of which was as follows:

The accompanying cut, Fig. 4, represents one end of a cylinder of a vertical Corliss engine, with the valves

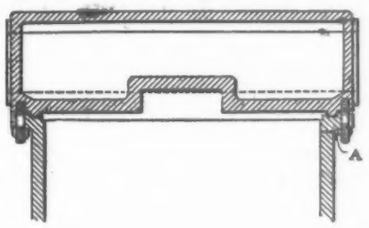


Fig. 4.—Strains Produced by Excessive Tightening of Nuts.

located in the cylinder head. With this example the nuts of the studs holding the head to the flange were screwed up so tight that it resulted in overstrain finding relief in a crack, which developed in the wall of the cylinder just under the flange, as shown at A. A tongue on the head fitted into a groove in the face of the cylinder flange; packing for making the joint was compressed in this groove by the pressure exerted by the tongue. When the packing was fully compressed further strain owing to overtightening of the bolts resulted in the fracture at A, which manifested itself some weeks after the joint had been made up. The crack extended part way around the cylinder, but did not result in entire rupture. It appears that when sufficient relief had been secured the crack ceased to extend, notwithstanding the presence of the steam pressure.

Other examples could be given showing the result of overstraining of bolts and parts of machinery, but this will serve the purpose.

AN INDICATING ANGLEMETER,

described by C. E. Sargent of Chicago, is an instrument for determing at sight the angular velocity variation in steam engine fly wheels, and more expressly in the fly wheels of internal combustion engines, with which the writer has had more to do. The instrument is applicable to any engine; is portable, easily attached, substantially built and direct reading.

A Graphical Daily Balance in Manufacture

was a paper by H. L. Gantt of Schenectady, N. Y.

At the December meeting in 1902 the writer presented a paper entitled "A Bonus System of Rewarding Labor," in which was given an account of the results gotten under that system at the works of the Bethlehem Steel Company and a description of the method employed. The paper dealt particularly with the method of setting a task and with the reward for its accomplishment. It consisted briefly in setting as a task for a day's work the amount that a good man could reasonably be expected to accomplish, and paying the man a substantial amount in addition to his day's wages if the whole amount was done. If less than that amount was done he simply got his day's wages. The result of this system, when the task was set in an intelligent manner and accompanied by a suitable compensation, was an efficiency of operation so far beyond that obtained by the ordinary day or piece work method that it attracted a great deal of attention.

This centering of the attention on the result had, however, a serious disadvantage, for it withdrew the attention from the most important parts of the paper—namely, that describing the method of setting the task and that referring to the method of operating the system by which an exact record was kept.

The method of setting the task is substantially that developed by Fred. W. Taylor for setting piece rates, and was described at some length. His paper before the present meeting further elucidates that part. The routine operation of the system, which involves keeping an exact daily record of the work done, was not, however, so clearly explained, and it is to that subject that this paper is devoted.

Man's Record.—In order to operate such a system we must not only have an exact record of what each workman does every day in order to find out whether he has earned his bonus or not, but must have beforehand an exact knowledge of the work to be done and how it is to be done. This amounts to keeping two sets of balances: one of what each workman should do and did do, the other of the amount of work to be done and is done. The former, or man's record, is concerned with the payment of the bonus, and consists in an exact comparison of what should be done as determined by our investigations and what has been done as shown by the daily reports.

Daily Balance of Work.—The latter is a balance of work on each order, and should show at a glance each day just what has been done and what remains to be done, in order to enable us to lay out the work for the next day in the most economical manner. The importance of such a balance has been long recognized, but the difficulty of getting it is such that it has seldom been attempted. Many concerns get a weekly or monthly balance, but in both of these cases the information is usually obtained too late to prevent delays in work. Again, the value of a balance is dependent largely upon its availability; in other words, upon the ease with which the desired information can be obtained from it. With this idea in mind the writer devised a combined schedule for work and a balance sheet that is largely graphical in its nature. On it dates are represented by positions, and when work is not done on consecutive days there are no entries in consecutive positions. This practice enables the foreman or superintendent to see at a glance what work is going along properly. Such schedules can be made out for all classes of work, and a description of one or two will amply illustrate the principle.

A Foundry Balance.—Fig. 5 represents such a balance sheet and schedule for a foundry. At the heads of the various vertical columns are the names of the pieces to be cast; under each is its pattern number; then, in order, when the pattern is due at the foundry, when it is received, the number wanted per day and the total number wanted. Below each column is divided into two columns headed daily and total. These are crossed by horizontal lines representing consecutive working days, on each of which is entered in the proper column the number of pieces made that day and the total number made to that date. Each column is crossed by two heavy horizontal lines, the upper one opposite the date at which the work should be begun and the lower one opposite the date at which the work should be completed. These lines are usually red, and have been very appropriately named danger lines. The position of the entries with reference to these danger lines and the amounts of those entries show to what extent the schedule is being lived up to. If the schedule is being well followed the entries are always in the neighborhood of the red lines or above them.

Fig. 5 represents a portion of an actual order showing how it was filled in the foundry of the Schenectady works. If there is no graphical check on the operations of the foundry the work that is wanted during a certain week may be spread over three or four.

It is an extremely difficult matter for a foreman to get the work done exactly in the order it is wanted. For instance, if we are building two locomotives per day, each requiring four driving boxes, it seems an extremely difficult thing for him to get every day, without fail, at least eight driving boxes. There is a constant tendency when he is rushed with work to drop to seven or six, with a corresponding decrease in output of locomotives. This tendency to give about what is wanted rather than exactly what is wanted is the most common obstacle to getting full output of a plant.

A Daily Balance as a Permanent Record.—This balance sheet shows not only how much work was done each day, but is a permanent record of exactly how the order was filled, which can be compared with the record of the previous and subsequent orders. This is best illustrated by a study of Fig. 5, which shows exactly where failure

FOUNDRY PRODUCTION SHEET.

A. L. CO. SCHENECTADY WORKS.

ORDER NO. 88
8 ENGINES D. L. & W.

THIS IS A PORTION OF AN ORDER SHOWING HOW THE RECORDS WERE ACTUALLY KEPT. THE FIGURES IN ITALICS REPRESENT CONDENSATIONS. THEY ARE USUALLY ENTERED IN RED INK.

PART.	Bell Stand	Exhaust Pipe.	Tender Frame Center Pin	Engine Truck Swing Bolster	Grate Bar	Grate Side.	Grate Side.	Ash Pan End.	Ash Pan Side.	Grate Frame Support.	Grate Bar.
PATTERN NO.	17,219	17,959	16,927	16,907	19,458	18,953	18,954	21,343	21,341	18,959	18,961
PATTERN DUE.	2–2	2–2	2–2	2–2	2–2	2–2	2–2	2–2	2–2	2–2	2–2
PATTERN REC'D.	1–22	1–22	2–6	2–4	2–9	2–10	2–10	2–10	2–10	2–14	2–14
NO. WANTED PER DAY.	1	1	1	1	8	2	2	1	1	1	1
TOTAL NO. WANTED.	8	8	8	8	64	16	16	8	8	8	8
NUMBER MOULDED.	Daily / Total	Daily / Total	Daily / Total	Daily / Total	Daily / Total	Daily / Total	Daily / Total	Daily / Total	Daily / Total	Daily / Total	Daily / Total

Begin moulding not later than date opposite upper heavy line. " " " lower " Finish " " " "

FEB '03 2 3 4 5 6 7 9 10 11 12 13 14 15 17 18 19 20 21 23 24 25 26

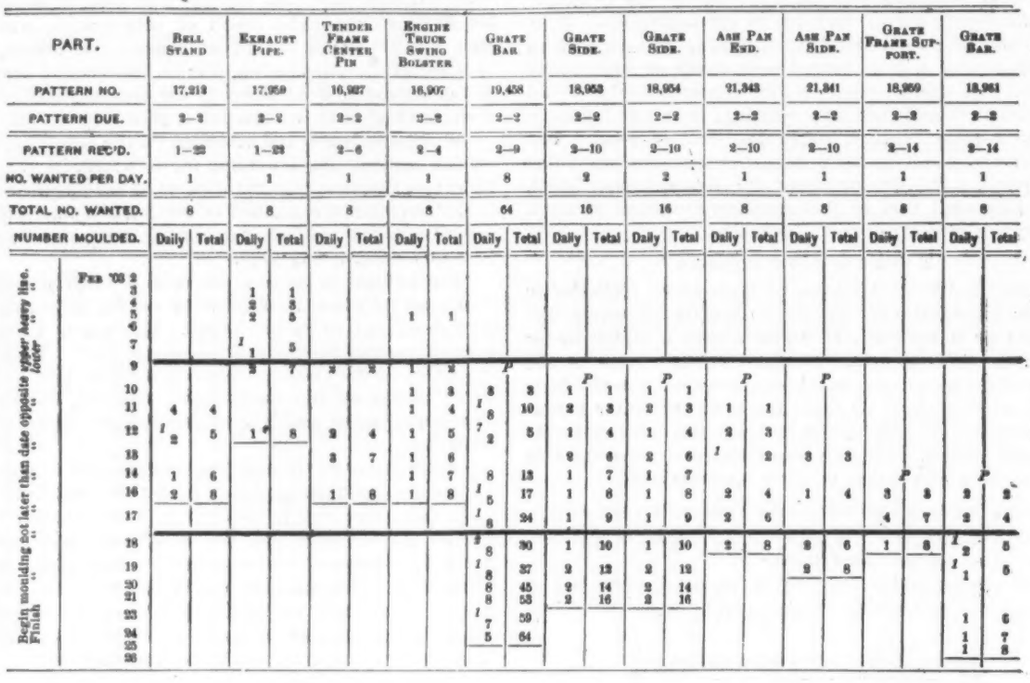


Fig. 5.

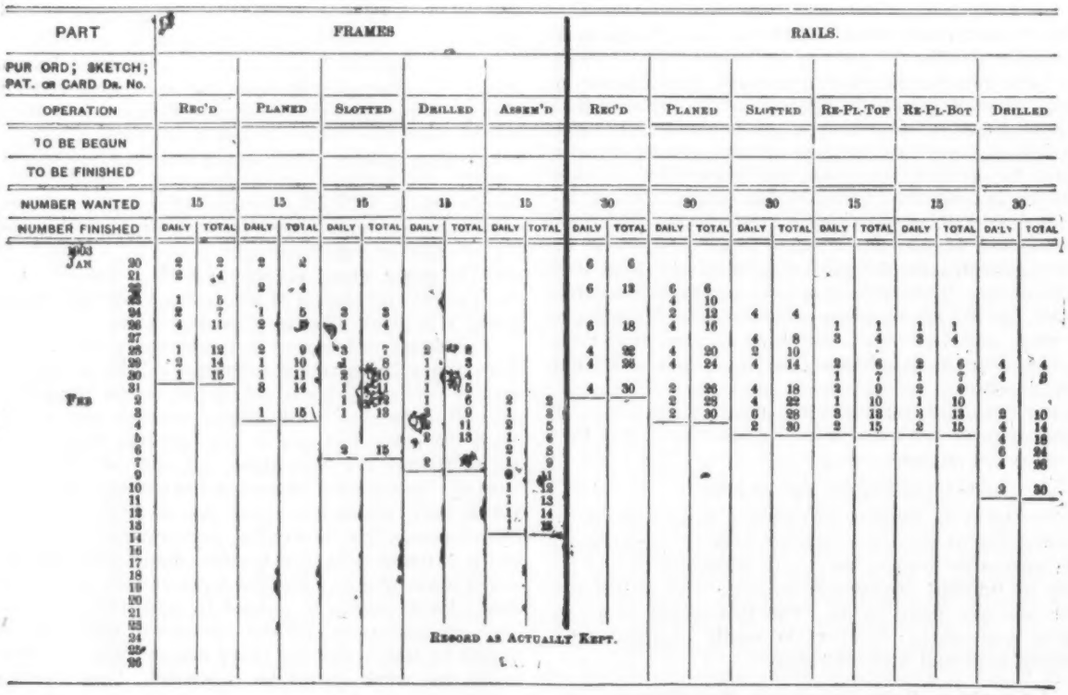
A. L. CO. PRODUCTION SHEET

SCHENECTADY WORKS MACHINE SHOP No. 1

ORDER No. 77
15 ENGINES N. Y. C.

PART	Frames						Rails.					
PUR ORD; SKETCH; PAT. OR CARD DR. No.												
OPERATION	Rec'd	Planed	Slotted	Drilled	Assem'd		Rec'd	Planed	Slotted	Re-Pl-Top	Re-Pl-Bot	Drilled
TO BE BEGUN												
TO BE FINISHED												
NUMBER WANTED	15	15	15	15	15		30	30	30	15	15	30
NUMBER FINISHED	Daily / Total	Daily / Total	Daily / Total	Daily / Total	Daily / Total		Daily / Total	Daily / Total	Daily / Total	Daily / Total	Daily / Total	Daily / Total

1903 JAN 20 21 23 24 26 27 28 29 30 31 FEB 2 3 4 5 6 7 9 10 11 12 13 14 16 17 18 19 20 21 23 24 25 26



RECORD AS ACTUALLY KEPT.

Fig. 6.

to comply with the schedule occurred. The letter P entered in some of the columns shows graphically the reason for the castings being behind. The pattern was not received until the date indicated. Similar sheets might show that it was the draftsman and not the pattern maker who was to blame.

A Machine Shop Balance and Routing Sheet.—Fig. 6 is a similar balance sheet for work done in a machine shop on a series of locomotive frames and rails. The order in which the various operations are to be performed has been determined and the consecutive columns devoted to the operations in their proper order. You will note that on this sheet, which is an actual record of work, the consecutive operations were performed promptly and that there was no serious delay.

Fig. 7 represents a record of the same work as it would appear if the works were short of frame drilling capacity and the drilling of frames were not done promptly. If it is impossible to make up the delay thus caused the output is limited by it. Such sheets show at a glance where the delays occur, and indicate what must

A. L. CO. PRODUCTION SHEET. ORDER No. 77
SCHENECTADY WORKS, MACHINE SHOP NO. 1. 15 ENGINES N.Y.C.

PART		FRAMES								RAILS.											
PUR ORD; SKETCH; PAT. OR CARD DR. NO.																					
OPERATION		REC'D		PLANED		SLOTTED		DRILLED		ASSEM'D		REC'D		PLANED		SLOTTED		RE-PL-TOP		RE-PL-BOT		DRILLED	
TO BE BEGUN																					
TO BE FINISHED																					
NUMBER WANTED		15		15		15		15		15		30		30		30		15		15		30	
NUMBER FINISHED		DAILY	TOTAL	DAILY	TOTAL	DAILY	TOTAL	DAILY	TOTAL	DAILY	TOTAL	DAILY	TOTAL	DAILY	TOTAL	DAILY	TOTAL	DAILY	TOTAL	DAILY	TOTAL	DAILY	TOTAL
1903 JAN	20	2	2	2	2							6	6										
	21	2	4																				
	22			2	4							6	12	6	6								
	23	1	5											4	10								
	24	2	7	1	5	3	3							2	12	4	4						
	26	4	11	2	7	1	4					6	18	4	16			1	1	1	1		
	27	1	12													4	8	3	4	3	4		
	28	2	14	2	9	3	7					4	22	4	20	2	10						
	29	1	15	1	10	1	8					4	26	4	24	4	14	2	6	2	6	4	4
	30			1	11	2	10											1	7	1	7	4	8
	31			3	14	1	11					4	30	2	26	4	18	2	9	2	9		
FEB	2					1	12							2	28	4	22	1	10	1	10		
	3			1	15	1	13							2	30	6	28	3	13	3	13	2	10
	4															2	30	2	15	2	15	4	14
	5					2	15															4	18
	6																					6	24
	7																					4	28
	9																						
	10																					2	30
	11							2	2														
	12							1	3														
	13							1	4	1	1												
	14							1	5	1	2												
	16							1	6	1	3												
	17							2	8	1	4												
	18							1	9	1	5												
	19							1	10	2	7												
	20							2	12	1	8												
	21							1	13	1	9												
	23							2	15	1	10												
	24									2	12												
	25									1	13												
	26									2	15												

THIS TABLE SHOWS THE WAY FIG. 7 WOULD LOOK IF THE WORKS WERE SHORT OF FRAME DRILLING CAPACITY.

Fig. 7.

have our attention in order to keep up the proper output. If the delay is always on the same operation we know that we must either get more output from the machines doing that work or get more machines. Lines representing when work should be begun and when it should be finished are used on the machine shop sheets as well as on the foundry sheet, but have been left off to avoid confusion.

A Graphical Balance as a History.—A complete set of such sheets for all the work being done in a plant gives a complete schedule and a daily record of what is being done, and is of the greatest possible advantage if an attempt is to be made to improve the conditions or increase the output of the plant. In fact, if the improvement in the operation of a plant is to be made in a scientific manner exact knowledge of what is taking place each day is absolutely necessary. Without it money is often spent wastefully and but a small proportion of the desired results obtained. In large plants run without such a system of balances it is frequently impossible to tell just what is holding back the output, and then the value of such a balance is out of all proportion to the cost of obtaining it. By using the graphical form its value is very much increased, for the general appearance of the sheet is sufficient to tell how closely the schedule is being lived up to; in other words, whether the plant is being run efficiently or not. Moreover, such a balance is a history of the way the work went through the shop and is readily comparable with similar work done previously or subsequently, thus enabling us to form a definite idea as to whether the plant is being run more or less efficiently. The balance of work sheet then gives us a daily analysis of how the work is progressing, and in its graphical form is so easily read that both foremen and superintendents find it of great value. The man's record shows the efficiency of each man, and the two taken together give us the knowledge in the clearest way of what should be done to increase our output.

Value of Balance Not Dependent Upon Method of Compensation.—It is not the intention of this paper to discuss the making of schedules for doing work, or instruction cards for the workmen to follow, or indeed the subject of compensation for work done, for the keeping of a daily balance of work done and a record of the men doing it are invaluable, no matter what the method of compensation. In fact, the writer has found the man's record when work was done by the day to be of the highest value, for when the men realize that not only their chance for increase of wages but that of holding their positions depends upon the amount and quality of their work they become very much more efficient. Add to this the fact that efficient men paid in proportion to their efficiency are invariably better satisfied than less efficient, cheaper men, and we have an added reason for keeping the man's record. Again, a workman easily forgets how many days he has been absent and how much poor work he has done, and an occasional glance at his record often does him a great deal of good. The writer first kept such a record in the foundry of the Midvale Steel Company 13 years ago, and found it so valuable that he has always done it since when possible. Such record sheets are so easily gotten up and of so many kinds that the writer has not considered it necessary to illustrate them.

The Graphical Balance and the Foreman.—Next to the superintendent the most overworked people in the ordinary manufacturing plant are the foremen. Their duties may be summed up as follows, in the order of their importance: To get their work out on time; to get it out economically; to improve their methods. Add to this their primary duties a multitude of others depending upon them and but little time is left for thought or in-

vestigation, on which depends improvement. When they are rushed, therefore, improvement is naturally the first thing to suffer. Further pushing causes economy to be sacrificed, for the work must get out, and the foreman has not time to go over and over his orders to see just what is the most economical arrangement of his work. Here is where the graphical schedule comes to his assistance, for he can see at a glance just what is behind or what should be done next. There has been but little difficulty in getting foremen to recognize the value of such a balance, and I have yet to learn of one who, having gotten such a sheet in full operation, was willing to give it up.

Cost of Keeping Balances.—The question is frequently asked as to the cost of keeping these records and balances. In reply I have to say that if such cost were ten times what it is it would cut no figure.

In day work we buy a man's time, and he frequently gives but little else. Our storekeeper checks exactly the materials we buy, but nobody knows exactly what the day workman has done in his ten hours. Although we know labor to be the most difficult commodity we have to buy, we give it the least systematic study, and my effort to get an exact record of what we get for our money is the first step toward purchasing it in an intelligent manner. With regard to the balance of work, I can only say that it is hard to estimate the cost of lack of harmony in a plant, and the increase in efficiency produced by getting materials in their proper order rather than according to the judgment of the various foremen is greater than is usually realized.

The fact that, as far as the writer's experience goes, the foremen are not only willing to use these graphical sheets, but are glad to do so in order to make their work harmonize with that of other departments, is the strongest proof of the value of the graphical over the other forms of balance.

The value of a balance of some sort is too well understood to need discussion, and the only reason that it has not been adopted is often the fancied cost of getting it. As a matter of fact, all I have suggested can usually be gotten by the ordinary time and cost keeping force with but little help, and frequently without any. It is so closely allied to the time and cost keeping that when all are done together by the best modern method the reduction of labor in getting the time and cost often more than offsets the increase due to keeping the men's records and the balance of work. The method referred to is the time and production card system, of which the following is a description. There are conditions under which the system to be described here may be modified; in fact, it is not always found possible to introduce it exactly as described, which, however, is the ideal method of operating it and should be approximated as nearly as possible. It was first introduced substantially in this form by Fred. W. Taylor at the works of the Bethlehem Steel Company.

Time and Production Card System.—In its best development a card is assigned the day previous to every man who is expected in at 7 a.m. the next day. Each of these cards is stamped with a rubber stamp 7 a.m. and the date. These cards are placed in a rack, which has a properly numbered space for each man, who takes from it his own card and no other. Any men coming in after 7 a.m. are not allowed access to the rack, but must get their cards from the office, where the cards are marked properly by a time stamp with the exact time each man comes in.

Without any delay each man goes directly to the work that has been assigned to him, and while his machine is running fills in on the card his name, his number, the order number, the machine number and the kind of work he is doing. At the end of the day he enters on his card the number of pieces that have been correctly finished, and the card is signed by the foreman or inspector, certifying that all of the entries are correct. If there have been errors in the work the foreman or inspector does not sign the time card, but makes out a supplementary card stating the exact nature of the errors, &c., and pins this card to the time card.

Fig. 8 represents a suitable form of day work card for use in some of the machine shops of the American Locomotive Company in connection with this system. At the end of the day or at noon the men are allowed access to the card racks as soon as the whistle has blown, and each man deposits his card in the proper pocket, an observer noting that a man deposits one card only. Men coming in after noon get their cards in the same manner as in the morning, the cards being previously stamped with the hour work begins and placed in the rack. Men who do not go out at noon do not need to change their cards. When the men have gone out at the end of the day or at noon the cards in the rack are stamped by means of a rubber stamp with the time the work ends.

ISSUED
RETURNED.

MAN'S NO._____
ORDER NO._____
MACHINE NO._____

MACHINE SHOP. | HOURS WORKED

WORKMAN'S NAME

NO. PIECES FINISHED.	SYMBOL.	OPERATION NO.

HOURS.	RATE.	WAGES	CONTRACTOR'S NO.

I HAVE INSPECTED THE ABOVE WORK AND ENTRIES AND BELIEVE THEM TO BE CORRECT.

ENTERED IN			
PAY SHEET	COST SHEET	RECORD SHEET	SIGNED BY THE FOREMAN OR HIS REPRESENTATIVE_____

A. L. CO. ENTER ONE ITEM ONLY ON A CARD.

Fig. 8.

The preferable form of card is a square one on paper stout enough to be shuffled. In the upper right hand corner of the card should be placed the man's number, the order number and the machine number. As there is room for one order number and one machine number only on one card, the workman must give in his card at the office and get a new one whenever he goes either on a new order or another machine.

Time and Man's Record.—In order to get a record of the man's time and work for the day all the cards bearing his number must be gotten together. If these do not give a total of the full number of working hours the first card of the day must show that he was late, or there must be a pass stating what time he went out. These passes should be the same size as the cards, and be put in with the time cards and sorted out by the man's number, so that when the clerk begins to enter the time and record he will have all the information at hand. The men's record may serve as a pay sheet, thus involving only one set of entries. When the time is entered up the clerk doing it enters his initial in the lower left hand corner in the sapce marked "pay sheet."

Cost.—To get the cost on an order the cards are then sorted by "order number," and when the clerk begins to enter up the time or wages against any order he should have before him all the cards representing work on that order. He is thus enabled to make the final entry directly from the cards, thus doing the work with a minimum of clerical labor. The clerk enters his initial in the space designated for such entry on "cost sheet."

Progress or Production.—To get a record of the work on any order the cards which have been sorted by order number are further sorted by name of part and operation. We thus get together the cards showing on an order the number of pieces on which a certain operation has been finished that day. These are added up and entered directly on the production or progress sheet. By this method we can keep an intelligible record of all the work done with a minimum of clerical labor.

Difficulty of Getting a Daily Balance.—It is not necessary for the purpose I have in mind to dwell further on the details, my object being only to show that the difficulty of getting this daily record of our men and a balance of work done is not so great as to be prohibitory. In other

words, it is an entirely feasible thing to know exactly all that has been done in a large plant one day before noon of the next, and to get a complete balance of work in order to lay out that afternoon in a logical manner the work for the next day.

Value of Such a Balance.—The value of such a balance consists in the fact that it makes clear details that no observer, however keen he may be, can see by inspection. It shows us what work is behind and how much, and enables us to trace to its source the cause of any delay. The superintendent sees at a glance what he never could find out by observation or by asking questions. It shows him how efficiently a plant is being run and where the defects in operation are. In connection with the man's record, it is the most complete analysis we can make of the working of a plant, and the one that will help us most quickly to bring into their proper channels things that have been going haphazard. Such an analysis is far more important than an improved tool steel or a new set of piece rates. It should be established before the introduction of either of these in order that we may have some means of measuring the gain made by their introduction, and it should remain after they are introduced to show that a forward step once taken is never retraced.

In conclusion the writer wishes to say that it is his opinion that we can do nothing in a manufacturing plant that will go so far toward increasing the output or the economy of operation as obtaining this exact knowledge of what is being done. The cost of getting it is almost nothing, and the methods of operation need not be disturbed in the least until an accumulation of knowledge points out the best course to pursue.

By the adoption of the methods outlined the accounting department ceases to be simply a critic of the manufacturing, and becomes an active assistant to every foreman and to the superintendent. In other words, the accounts cease to be simply records of production and become potent factors in helping the producing departments.

The Machine Shop Problem

was a paper by Charles Day, Nicetown, Philadelphia.

It has been our good fortune to have had the opportunity to familiarize ourselves with Fred. W. Taylor's work in shop management, as well as with the paper which he has prepared for this meeting. Being heartily in sympathy with his methods, at the present time being engaged in the introduction of his system for one of our clients, it will hardly be necessary to state that many of the factors considered below are original with him. It is not the intention, however, of this paper to either discuss or outline the Taylor system, but rather to point out a few facts which have been forcibly impressed upon us when in charge of the equipment and management of manufacturing establishments. Foremost among these we would mention the absence of a uniform development of the various departments of which they are composed.

Starting with the broadest possible subdivision of a business, we usually find a marked contrast in the general efficiency of the departments, the management, as a rule, directing the greater part of their time and energy to the development of lines for which they have a particular taste, according as they may have been influenced by their past opportunity and experience. This state of affairs is as clearly exemplified when planning the equipment and organization of a new plant as the maintenance and development of an old one.

The buildings, which should be secondary to the equipment, are commonly designed and erected without proper consideration of the work in view, limitations being imposed by this work rendering the use of the proper methods and apparatus of but small value. The shop architect cannot lay out to advantage buildings for a given plant unless conversant with the character of the work. The location of the machines, the system of power transmission and innumerable other details materially affect the design of buildings. Notwithstanding these almost self evident facts, manufacturers continue to design and erect their buildings independently of the equipment or the work in view. So much can be effected by a proper consideration of all details in connection with the plant before proceeding with any work that we will take this problem up more fully later on.

Equally one sided conditions are encountered in the establishment that is in operation, a most efficient sales department existing alongside a shop where economic production is out of the question; and so examples could be cited indefinitely. A further analysis of any one department usually reveals the same state of affairs, a lack of co-ordination and thoroughness being exemplified. The success of one plant, as compared with another engaged in the same line of work, depends upon the balance of the efficient and inefficient departments, and just as Mr. Taylor has pointed out that a machine shop foreman possessing all the qualities required by that position can but rarely be obtained, so the majority of establishments excel in but a few of the branches of which their business is composed.

Needless to say there is seldom any premeditated desire to develop one side of a business at the sacrifice of the other, lack of appreciation of the relative importance of the different factors being the chief reason for error in this direction. To be successful in this work requires a rare combination of the ability to stand off and "size up" the problem as a whole, followed by a concentration of energy on the details which alone can culminate in the anticipated results.

It is for this reason that an engineer making a study of this work can frequently detect the weak points of a manufacturing plant, the system of fundamental analysis being more powerful in the hands of one who has not been in close association with the work. We think the condition of affairs can hardly be illustrated better than by quoting from an editorial in one of our technical papers of about a year ago, which stated that "many engineers suffer from using lenses of too high power and too narrow a field; in such matters the telescope is sometimes of as much value as the microscope. It often pays better to learn what others are doing than to know with unnecessary particularity what one is doing one's self."

While no two establishments are alike in detail, the same course of study should be pursued in every instance. A comprehensive understanding of any problem can only result after a most exhaustive study of the smallest details into which it can be subdivided, such investigation if properly carried out invariably resulting in an insight that is truly astonishing.

GRAPHICAL PRESENTATION.

We have found that the graphical presentation of complex problems facilitates greatly a study of their various elements, this scheme being resorted to by us in many lines of work. While in many cases only "relations" can be expressed in this way, yet as the mind can grasp the problem, as a whole, so much more quickly the system is invaluable.

While we intend to devote this paper to the machine shop in particular, a general subdivision of the departments of a given establishment is given below, Fig. 9, showing the position occupied by the machine shop in the general scheme.

No one man would attempt to have sole charge of all the detail work in all of the departments enumerated, the subdivision of a business among a number of heads being a natural course to follow. At the same time some means must be provided for bringing all the departments in touch with each other in such a way that they will cooperate and direct all their efforts to a common end with the least expenditure of energy. A lack of co-operation, in the full sense of the word, between the principal subdivisions of a business results in an enormous expenditure of useless energy and money in the majority of manufacturing establishments. All that may be said in this connection, when considering the most general subdivision of a business, is equally true when discussing the relation of the subdivisions or elements of each department.

Antagonism between the sales and engineering departments prevents the latter from embodying changes or alterations in their apparatus which might make it much more efficient and suitable for the conditions which it is to meet.

The drafting room, through their ignorance of the shop equipment, constantly design apparatus which can

only be machined at great expense. The pattern shop, for the same reason, could frequently greatly simplify the work in the shop by helpful construction of patterns which would facilitate handling, centering, &c., and so examples could be cited indefinitely illustrating the point made above.

When a shop is in operation these conditions can be met to the best advantage by periodic meetings between the heads of the various departments, where every man has full privilege to the floor and every question which is raised is definitely decided and, if approved, put in force immediately. In this way every question, even of the most trivial character, is brought before a number of men and its value quickly determined. Nothing is more discouraging to an enthusiastic worker than to have schemes, which he has formulated after much thought and experiment, passed upon as good but not put into operation, the man who has the power postponing it indefinitely on account of other work which he may have in view.

Conditions are, of course, very different in different establishments. In the "tonnage" plant one man may be able to take care of all the work, carrying in his mind the entire scheme and if he has exceptional ability in this particular field efficient results are likely to follow. When the work is complex in character, however, it must be subdivided among a number of men, it being ever borne in mind that the first essential to success is thorough co-operation between the various departments.

Devoting our attention to the production department, we still find the subject too complex to consider intelligently without a chart giving a further division of the various factors. The chart shown in Fig. 10 subdivides the production department into the buildings, equipment, &c., each of these details being further analyzed. The absurdity of spending a large amount of time and energy on any one of these details without consideration of the others is self evident when presented in this way; and, just as we pointed out that most businesses are developed to a comparatively high efficiency in but a few of their numerous departments, so further analysis reveals the same state of affairs.

Reference was made to the importance of proper buildings in connection with manufacturing plants, and for some lines of work maximum efficiency can only follow when they have been designed for the work in view, the question being one of shop requirements and not architecture as ordinarily understood.

Probably nothing has increased the possibilities of the machine shop to a greater degree than the power crane, and although the designer of the building is always informed, in a general way, as to the crane service that will be required, this detail is not usually given nearly sufficient consideration. To properly cover the floor space with power cranes, jib cranes, &c., requires a most careful study of the location of various machines, which in turn necessitates a thorough understanding of the work in view.

SHOP EQUIPMENT.

Old systems of management, as a rule, take no adequate account of the progress of the various pieces of work through the shop, but when operations are analyzed and prescribed, as by the Taylor system, the route of each piece must be carefully planned.

The customary scheme of allotting separate sections of the side bays of a shop to different classes of work, such as lathe department, drill press department, grinding department, &c., and allowing sufficient additional space to take care of the growth of these departments, can hardly be termed good practice. Money is tied up for a number of years which yields no return; and when the space is ultimately occupied further extensions usually result in a most inefficient arrangement of tools.

The designs of a number of the largest shops which have been erected during the past few years consist in erecting shops with perpendicular wings, where the detail work is done. We have but one plant in mind where this scheme has been carried still further, each department being contained in a wing building, which may be extended as the work demands.

The scheme of power transmission adopted will influence quite appreciably the design of buildings, the advantage of using motors on individual machines being frequently justified by the reduced first cost of buildings alone.

The lighting of the machine shop or foundry to a marked extent influences the efficiency of the men, and the importance of this fact is generally appreciated at this time. It is practically impossible to obtain too much light, provided the direct rays of the sun do not fall on the work. As large establishments usually run night and day, a liberal amount of artificial light is also necessary if the different shifts are to turn out equal amounts of work. Shops that are illuminated in a general way by arc lamps (as well as incandescent lights for detail work) seldom complain of the inefficiency of the night shift.

We have pointed out a few of the details which should be borne in mind when planning a new building for a given kind of work. We may appear to dwell at unnecessary length upon details which are self evident, but we have so frequently been called upon for advice after limitations had already been imposed by the work which had been completed, rendering the use of various types of desirable apparatus practically impossible, that we do not hesitate to dwell upon it here.

The machine tool equipment must receive the closest study of one familiar with the latest types of apparatus, rapid progression in its development handicapping greatly shops which were equipped but a few years ago.

Some of the largest shops use a cheap grade of carbon steel for cutting tools, instead of the "air hardening" variety which would permit of double the cutting speed, the reduced first cost being their reason for this policy. In such a plant $5000 invested in tool steel might readily effect a saving on the labor bill of $15,000 annually. Such an illustration exemplifies forcibly the absence of scientific thought and investigation existing but a few years since.

The "type of equipment" will depend upon the character of the work and, as the province of the machine shop is radically different for various lines of work, there are no hard and fast rules which may be followed. The three examples given below will illustrate this point:

1. In a rolling mill plant, for example, the repair shop equipment is only used in case of break downs, and in a number of instances we can recall special machines which have been purchased for repairing single details of the equipment and which have been used but a few days in several years. This illustrates an extreme case, where it is necessary to carry a heavy investment in order to be prepared for break downs. The equipment or management of such a shop would not influence greatly the cost of the product, consequently when purchasing machines to meet these conditions the consideration of many of the details which would prove most efficient were the tools to operate at all times would not be desirable.

2. The work in a locomotive shop consists largely in overhauling engines at periodic intervals, so that under normal conditions these shops should operate at their full capacity. Special machinery can be used for a great deal of this work. In this instance the shop is a much more important factor in the general scheme, the periodic repair of the rolling stock being a first essential in railroad work. Economic production in this field results when the locomotives and cars are detained in the shop the least possible time, the actual saving in machinists' wages being a small item as compared with earning power of the rolling stock.

3. On the other hand, the equipment and management of a machine shop doing purely manufacturing work are vital factors of the organization, a slight reduction in labor cost frequently resulting in an enormous increase in business. This is particularly true of concerns manufacturing duplicate articles in large quantities, where price materially affects the quantity of goods sold. High efficiency usually accompanies duplication, and the only way that a low first cost may be attained when doing work which varies in character is by dictating to the workmen the methods of machining, as described in connection with the Taylor system of management.

Why has shop equipment advanced so slowly and why so much doubt as to the merit of recent discoveries, such as the high speed tool steel and the motor drive? Simply because shop management—the vital force behind the ma-

chine—has been unable to keep pace with the development of the apparatus, the lack of it constantly acting as a drag on pioneering work in this direction.

The efficiency of machine shop equipment should be judged only from its ability to produce the desired result at a minimum cost, and this, in turn, is governed as much by the information at the disposal of the operators as the machines themselves. In the extreme case, such as a full automatic screw machine, we might suppose that the ability of the designer would assure the success of the tool; but even in this case innumerable details arise, such as the grinding and setting of cutters, the delivery of of certain improvements. It is unfortunate that the manufacturer in many instances is not in close enough touch with the conditions he is endeavoring to meet to attain the best result. Many of the builders of electrical apparatus suffer from this cause, designing and manufacturing equipment for machine tool driving which may be be most efficient from the standpoint of the electrical engineer but utterly unsuited to shop requirements.

In contrast to the methods described above, we must again allude to the work of Mr. Taylor in the field of shop equipment and management. His system of management consists primarily in a planning department, in

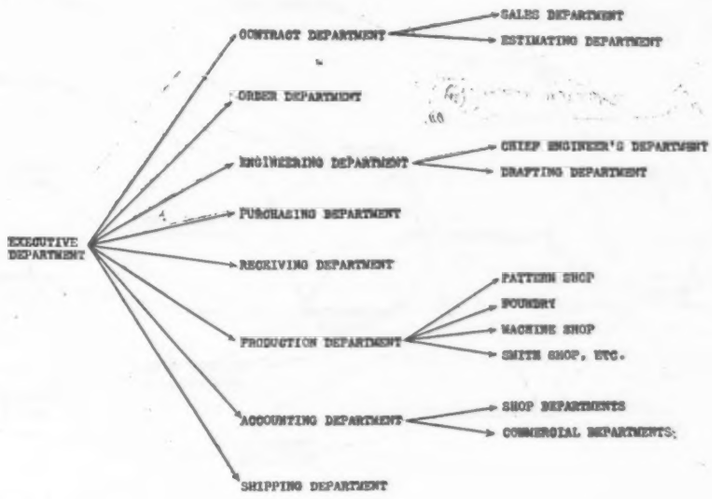


Fig. 9.

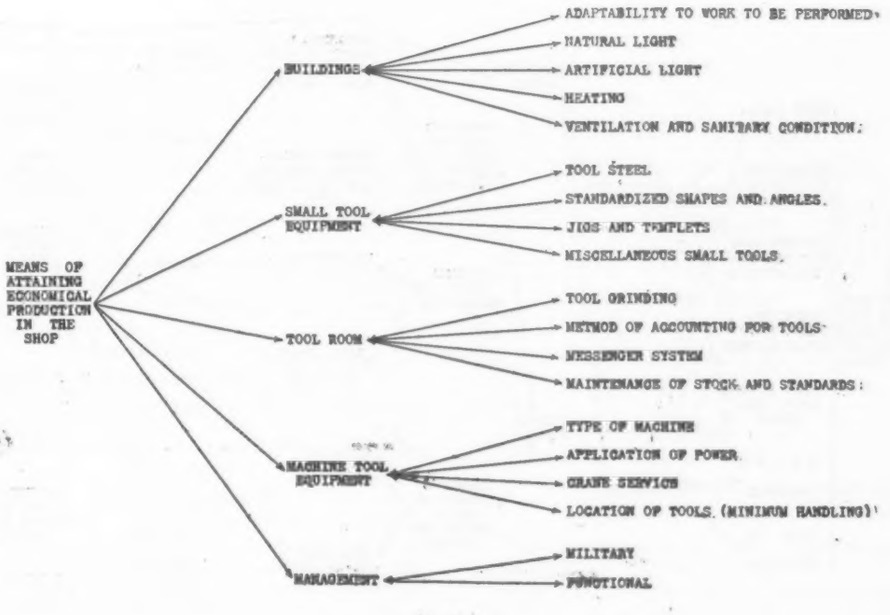


Fig. 10.

THE MACHINE SHOP PROBLEM.

stock to and from the machine, &c., which may or may not be efficiently taken care of by the purchaser.

At a recent meeting of the Philadelphia Engineers' Club Admiral Melville pointed out forcibly the great need of experimental research in all lines of engineering. He cited the laboratory which the German Government has instituted at Charlottenburg, and said that the data collected from experiments conducted here unquestionably accounted for Germany's undisputed position as the foremost designer and builder of battle ships and "ocean grayhounds."

The best efforts of the engineer can only be called forth by a thorough realization of the need and utility which by means of information at hand the workman is instructed, through a system of functional foremanship, as to the exact method of doing the work. This planning department bears the same relation to the shop that the drafting room does to the engineering department. This statement conveys no impression as to the vast amount of detail knowledge Mr. Taylor has accumulated and which accounts largely for his success. His methods have constantly aimed at uniformity and standardization, the Taylor-White process being but one of many examples which could be cited as the result of this work. Together with his assistants, he has obtained an enormous amount of data relative to cutting metals which is made

applicable by means of slide rules. The underlying principle of all his work, a high wage with a low labor cost, involves the keenest appreciation of the labor problem. Not a single detail of shop equipment can escape the application of the Taylor system, and it is only in this way that continued high efficiency of operation can be secured.

Returning to the small tool equipment, a separate paper could readily be written on each of the subdivisions enumerated on Chart 2, Fig. 10.

The small attention given to the cutting tool in the Taylor has frequently pointed out the need of proper care of belts, few shops give them any consideration. The "Method of Accounting for Tools," "Messenger System" and "Maintenance of Stock and Standards" are details which can only be considered in connection with a given plant.

When deciding upon the type of machine desirable, it is necessary to consider the question of "power application," but as this, in turn, may depend upon other considerations—such as transmission, lighting, &c.—it is

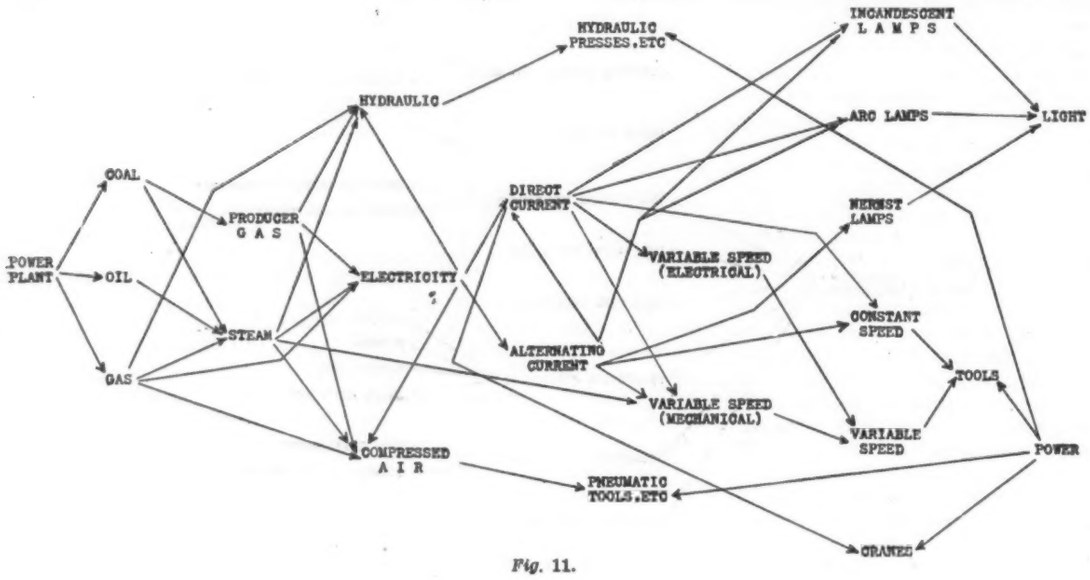


Fig. 11.

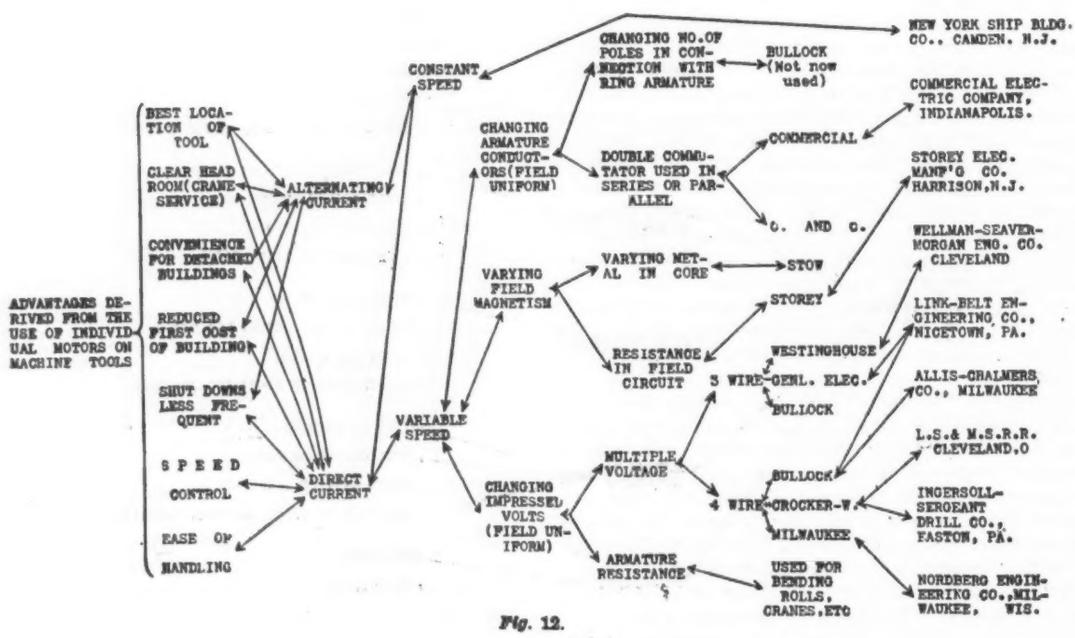


Fig. 12.

THE MACHINE SHOP PROBLEM.

vast majority of shops is astonishing when we realize how directly the time of machining is dependent on the character of the steel. We are all constantly hearing of phenomenal cutting speeds, &c., but it is the efficiency of the tools in the tool racks that is a gauge of their value. If these tools are not forged and ground to standard angles, and reground by a man who realizes fully the care which must be exercised in this work, the chances are that the majority of them will be but scarcely better than the original Mushet steel.

In the majority of shops the possibilities of the equipment are cut in two by lack of attention to the belting and cutting tools. Notwithstanding the forcible way Mr.

desirable to apply the same scheme of graphical analysis.

Chart 3, Fig. 11, indicates approximately the number of courses which may be open for fulfilling the conditions in view. Either coal, oil or gas may be used, according to the location and size of plant, and so the desirability of each of the following alternatives will be governed by special conditions.

Probably no subject has been open to more energetic discussion than that of the motor driving of machine tools, the mistake many authors have made when writing on this topic being that while their experience has been in but one line of work they apply their deductions to machine shops in general. A system of driving which

might be most desirable for a shop manufacturing a great variety of articles would not, in all probability, be suited for a railroad repair shop.

The possible advantages resulting from the use of individual motors and the various types of apparatus manufactured for this work, are graphically shown in Chart 4, Fig. 12. The names of concerns who have installed the different systems are given to the right. During the past five years a discussion of these systems has received a great deal of consideration before this and other engineering bodies, and we will only say in this connection that the question is one of shop requirements rather than electrical design.

If a plant covers a large tract of land and the variable speed machines require but a small percentage of power it might be desirable to generate alternating current for lighting and constant speed motors, using a motor generator giving multiple voltage circuits for the variable speed tools. Such a plant would be using both alternating and direct current, while in more condensed plants one or the other alone would have decided advantage; and so it is with the numerous system of motor driving upon the market at the present time. There are conditions where each may be especially suited.

If a cutting tool is to work to its maximum efficiency, the cutting speed should be maintained constant for a given depth of cut and a given feed, consequently some means should be provided for accelerating the spindle speed of a lathe when the tool is working from a larger to a smaller diameter, such as facing cylinder heads, &c. A lathe of this character may be truly termed a variable speed machine. In the average shop, however, there is very little opportunity for work of this kind, the majority of lathe work consisting of longitudinal cuts. If the lathe operates on but one class of work, the proper spindle speeds and feeds can be obtained, which should not be changed as long as conditions remain unaltered. If, on the other hand, a great variety of work is handled by a lathe, the tool will constantly work on different diameters, variable speed being equally as important in this case as in the first considered, although a uniform increase as the work proceeds would not be required. Simple as this classification may seem, the electrical engineer repeatedly fails to see that a system of motor driving that would be applicable in one case utterly fails in another.

Practically all machine shops have some variable speed tools, and here again it is the province of the engineer to determine the relative importance of the various factors. A manufacturer who advertises a variable speed countershaft or motor for machine tool driving which will give any speed shows his ignorance of shop conditions, where a refinement of this kind cannot be used to advantage. In fact, after visiting practically all the shops that have installed multiple voltage equipment offering the possibilities of close speed regulation and ease of handling, we are convinced that the purchasers are not beginning to realize an adequate return on the investment. A better illustration could not be found of the interdependence of management and equipment.

The two principal types of management, military and functional, are, of course, capable of the same analysis and graphical presentation as illustrated above. Chart 5,

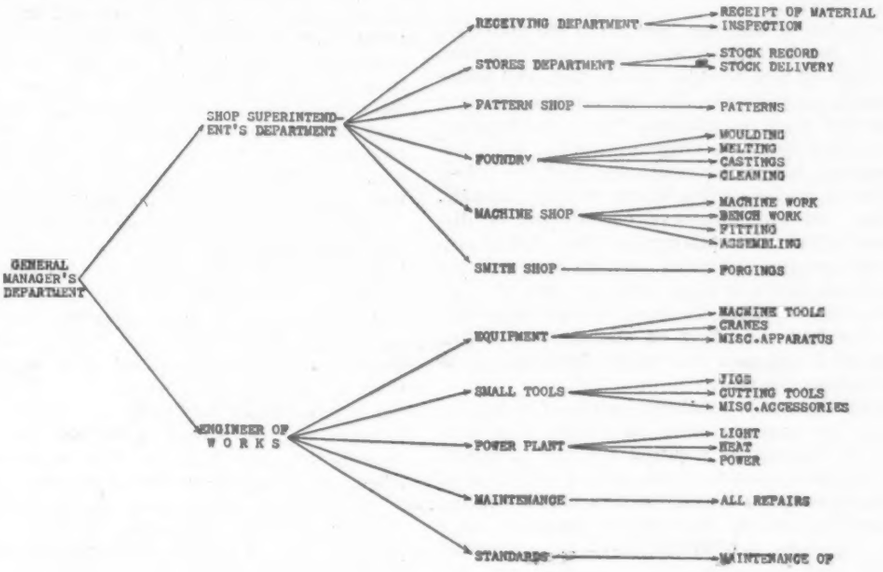


Fig. 13.

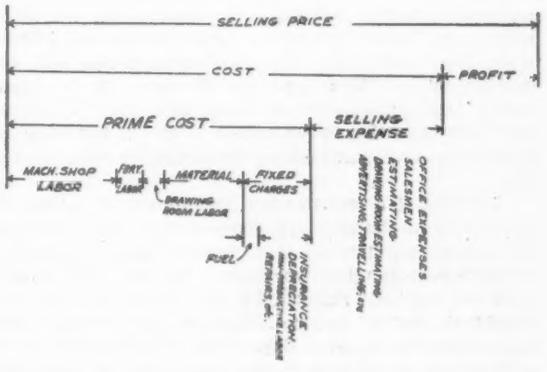


Fig. 14.

THE MACHINE SHOP PROBLEM.

Fig. 13, is included as showing a further subdivision of the departments of Chart 1, Fig. 9.

While all the charts given above are only of value in so far as they present to the mind a picture which can be readily comprehended, we can, at times, graphically distribute costs, &c., showing the cost value of the different operations. Such a chart is illustrated in Fig. 14, and indicates in what direction economies are most likely to be effective.

In conclusion, let us again state that a comprehensive understanding of any problem can only result after an exhaustive study of the smallest details into which the problem can be subdivided. The success of modern methods in the accounting as well as the productive departments depends on this.

The balance of accounts of the yearly business will unquestionably reveal the profit or loss, but gives no idea as to how to better conditions. A system of cost keeping which gives the total cost of the different articles manufactured may aid greatly in estimating, but will prove of small value as a check on efficient production.

A system of cost keeping should not only give the present cost, but indicate how this figure may be lowered. To accomplish this end, each operation must be studied and recorded and each pound of material checked. The system must be alive and full of energy, as mere form is nothing.

A valuable and timely paper was the one by Fred. W. Taylor of Philadelphia on

Shop Management.

This paper was really a treatise of 120 pages. In one thing Mr. Taylor has set a good example in accompanying his paper with a copious index of the subjects treated. We take the following:

Up to the spring of the year 1899 all of the materials in the yard of the Bethlehem Steel Company had been handled by gangs of men working by the day, and under the foremanship of men who had themselves formerly worked at similar work as laborers. Their management was about as good as the average of similar work, although it was bad, all of the men being paid the ruling wages of laborers in this section of the country—namely, $1.15 per day, the only means of encouraging or disciplining them being either talking to them or discharging them; occasionally, however, a man was selected from among these men and given a better class of work with slightly higher wages in some of the company's shops, and this had the effect of slightly stimulating them. From 400 to 600 men were employed on this class of work throughout the year.

The work of these men consisted mainly of unloading from railway cars and shoveling onto piles, and from these piles again loading, as required, the raw materials used in running three blast furnaces and seven large open hearth furnaces, such as ore of various kinds, varying from fine, gravelly ore to that which comes in large lumps, coke, limestone, special pig, sand, &c., unloading hard and soft coal for boilers, gas producers, &c., and also for storage, and again loading the stored coal as required for use, loading the pig iron produced at the furnaces both for shipment, for storage and for local use, and handling billets, &c., produced by the rolling mills. The work covered a large variety as laboring work goes, and it was not usual that a man was kept continuously at the same class of work. Before undertaking the management of these men the writer was informed that they were steady workers, but slow and phlegmatic, and that nothing would induce them to work fast.

His first step was to place an intelligent, college educated man in charge of progress in this line. This man had not before handled this class of labor, although he understood managing workmen. He was not familiar with the methods pursued by the writer, but was soon taught the art of determining how much work a first-class man can do in a day. This was done by timing with a stop watch a first-class man while he was working fast. The best way to do this, in fact almost the only way in which the timing can be done with certainty, is to divide the man's work into its elements and time each element separately. For example, in the case of a man loading pig iron onto a car, the elements should be: Picking up the pig from the ground or pile (time in hundredths of a minute). Walking with it on a level (time per foot walked). Walking with it up an incline to car (time per foot walked). Throwing the pig down (time in hundredths of a minute), or laying it on a pile (time in hundredths of a minute). Walking back empty to get a load (time per foot walked).

In case of important elements which were to enter into a number of rates, a large number of observations were taken when practicable on different first-class men, and at different times, and they were averaged.

The most difficult elements to time and decide upon in this, as in most cases, are the percentage of the day required for rest, and the time to allow for accidental or unavoidable delays.

In the case of the yard labor at Bethlehem, each class of work was studied as above, each element being timed separately, and in addition, a record was kept in many cases of the total amount of work done by the man in a day. The record of the gross work of the man who is being timed is, in most cases, not necessary after the observer is skilled in his work. As the Bethlehem time-observer was new to this work, the gross time was useful in checking his detailed observations and so gradually educating him and giving him confidence in the new methods.

The writer had so many other duties that his personal help was confined to teaching the proper methods and approving the details of the various changes, which were in all cases outlined in written reports before being carried out.

As soon as a careful study had been made of the time elements entering into one class of work, a single first-class workman was picked out and started on ordinary piece work on this job. His task required him to do between three and one-half and four times as much work in a day as had been done in the past on an average. Between 12 and 13 tons of pig iron per man had been carried from a pile on the ground, up an inclined plank and loaded on a gondola car by the average pig iron handler while working by the day. The men in doing this work had worked in gangs of from five to 20 men.

The man selected from one of these gangs to make the first start under the writer's system was called upon to load on piecework from 45 to 48 tons (2240 pounds each) per day. He regarded this task as an entirely fair one and earned on an average, from the start, $1.85 per day, which was 60 per cent. more than he had been paid by the day. This man happened to be considerably lighter than the average good workman at this class of work. He weighed about 130 pounds. He proved, however, to be especially well suited to this job, and was kept at it steadily throughout the time that the writer was in Bethlehem, and I believe is still at the same work.

Being the first piece work started in the works, it excited considerable opposition, both on the part of the workmen and of several of the leading men in the town, their opposition being based mainly on the old fallacy that if piece work proved successful a great many men would be thrown out of work, and that thereby not only the workmen but the whole town would suffer.

One after another of the new men who were started singly on this job were either persuaded or intimidated into giving it up. In many cases they were given other work by those interested in preventing piece work, at wages higher than the ruling wages. In the meantime, however, the first man who started on the work earned steadily $1.85 per day, and this object lesson gradually wore out the concerted opposition, which ceased rather suddenly after about two and one-half months. From this time on there was no difficulty in getting plenty of good men who were anxious to start on piece work, and the difficulty lay in making with sufficient rapidity the accurate time study of the elements or "unit times" which forms the foundation of this kind of piece work.

Throughout the introduction of piece work, when after a thorough time study a new section of the work was started, one man only was put on each new job, and not more than one man was allowed to work at it until he had demonstrated that the task set was a fair one by earning an average of $1.85 per day. After a few sections of the work had been started in this way the complaint on the part of the better workmen was that they were not allowed to go on to piece work fast enough. It required about two years to transfer practically all of the yard labor from day to piece work. And the larger part of the transfer was made during the last six months of this time.

As stated above, the greater part of the time was taken up in studying "unit times," and this time study was greatly delayed by having successively the two leading men who had been trained to the work leave because they were offered much larger salaries elsewhere. The study of "unit times" for the yard labor took practically the time of two trained men for two years. Throughout this time the day and piece workers were under entirely separate and distinct management. The original foremen continued to manage the day work, and day and piece workers were never allowed to work together. Gradually the day work gang was diminished and piece workers were increased as one section of work after another was transformed from the former to the latter.

Two elements which were important to the success of this work should be noted: First, on the morning following each day's work, each workman was given a slip of paper informing him in detail just how much work he had done the day before, and the amount he had earned. Thus enabling him to measure his performance against his earnings while the details were fresh in his mind. Without this there would have been great dissatisfaction among those who failed to climb up to the task asked of them, and many would have gradually fallen off in their performance.

Second, whenever it was practicable, each man's work was measured by itself. Only when absolutely necessary was the work of two men measured up together and the price divided between them, and then care was taken to select two men of as nearly as possible the same capacity. Only on few occasions, and then upon special permision signed by the writer, were more than two men allowed to work on gang work, dividing their earnings between them. Gang work almost invariably results in a falling off in earnings and consequent dissatisfaction.

An interesting illustration of the desirability of individual piece work instead of gang work came to our attention at Bethlehem. Several of the best piece workers among the Bethlehem yard laborers were informed by their friends that a much higher price per ton was paid for shoveling ore in another works than the rate given at Bethlehem. After talking the matter over with the writer he advised them to go to the other works, which they accordingly did. In about a month they were all back at work in Bethlehem again, having found that at the other works they were obliged to work with a gang of men instead of on individual piece work, and that the rest of the gang worked so slowly that in spite of the high price paid per ton they earned much less than at Bethlehem.

When the writer left the steel works the Bethlehem piece workers were the finest body of picked laborers that he has ever seen together. They were practically all first-class men, because in each case the task which they were called upon to perform was such that only a first-class man could do it. The tasks were all purposely made so severe that not more than one out of five laborers (perhaps even a smaller percentage than this) could keep up.

It was clearly understood by each newcomer as he went to work that unless he was able to average at least $1.85 per day he would have to make way for another man who could do so. As a result, first-class men from all over that part of the country, who were in most cases earning from $1.05 to $1.15 per day, were anxious to try their hands at earning $1.85 per day. If they succeeded they were naturally contented, and if they failed they left, sorry that they were unable to maintain the proper pace, but with no hard feelings either toward the system or the management. Throughout the time that the writer was there labor was as scarce and as difficult to get as it ever has been in the history of this country, and yet there was always a surplus of first-class men ready to leave other jobs and try their hand at Bethlehem piece work.

Perhaps the most notable difference between these men and ordinary piece workers lay in their changed mental attitude toward their employers and their work, and in the total absence of soldiering on their part. The ordinary piece worker would have spent a considerable part of his time in deciding just how much his employer would allow him to earn without cutting prices and in then trying to come as close as possible to this figure, while carefully guarding each job so as to keep the management from finding out how fast it really could be done. These men, however, were faced with a new but very simple and straightforward proposition—namely, am I a first-class laborer or not? Each man felt that if he belonged in the first class all he had to do was to work at his best and he would be paid 60 per cent. more than he had been paid in the past. Each new piece work price was accepted by men without question. They never bargained over nor complained about rates, and there was no occasion to do so, since they were all equally fair and called for almost exactly the same amount of work and fatigue per dollar of wages.

A careful inquiry into the condition of these men when away from work developed the fact that out of the whole gang only two were said to be drinking men. This does not, of course, imply that many of them did not take an occasional drink. The fact is that a steady drinker would find it almost impossible to keep up with the pace which was set, so that they ware practically all sober. Many, if not most, of them were saving money, and they all lived better than they had before. The results attained under this system were most satisfactory, both to employer and workmen, and show in a convincing way the possibility of uniting high wages with a low labor cost.

This is virtually a labor union of first-class men who are united together to secure the extra high wages, which belong to them by right and which in this case are begrudged them by none, and which will be theirs through dull times as well as periods of activity. Such a union commands the unqualified admiration and respect of all classes of the community; the respect equally of workmen, employers, political economists and philanthropists. There are no dues for membership, since all of the expenses are paid by the company. The employers act as the officers of the union, to enforce its rules and keep its records, since the interests of the company are identical and bound up with those of the men. It is never necessary to plead with or persuade men to join this union, since the employers themselves organize it free of cost; the best workmen in the community are always anxious to belong to it. The feature most to be regretted about it is that the membership is limited.

What the writer wishes particularly to emphasize is that this whole system rests upon an accurate and scientific study of "unit times," which is by far the most important element in modern management. With it greater and more permanent results can be attained even under ordinary day work or piece work than can be reached under any of the more elaborate systems without it.

Discussion.

In discussing the three papers on systems of shop management Mr. Taylor gave a very instructive and interesting account of how the system can be introduced. He laid great stress upon the fact that no methods, premium, bonus or any other can be made to immediately cover the entire works, or even one department, or even a branch of one department. It is absolutely necessary to start the education with a single individual and to carefully select the man to be experimented with. The scheme is fully and clearly explained to him and he is impressed with the fact that it will be to his material advantage to do the best be can. Labor unions could not prevent this, as they might if a wholesale change were attempted. Having proved to the satisfaction of this man that he will be permanently benefited, get another and go through the same process with him. Following this plan it will not be long before the leaven has worked through the entire plant, and, like sheep, all will want to follow the leader and will clamor for a participation in the good thing. Take one man at a time, not a group; make him do one thing; education him by details, not by collections, and you are sure to win him in the end. Concentration at one point is what is needed and what will succeed. Mr. Taylor explained how he had accomplished this at the Bethlehem Steel Works. He selected one man who was handling pig iron. This man was chosen as being ambitious to get along. He was honest, industrious and had partly paid for a small house. After a full explanation he agreed to try the experiment. He was separated as far as possible from all the other men handling pig. The result was that the man made higher wages, while he did much more work, more in proportion than the increased wages. The arrangement was, therefore, of mutual advantage, the man getting more pay and the plant more work. A second man was then tried, until finally all became convinced that the plan was meant for their good. Mr. Taylor stated that results come slowly, and in large works it may be necessary to wait two, three or four years. But the plan will work no matter how strongly the shop may be unionized. Men are injured if paid too low a premium, and also if paid too high—there is a happy medium.

Another speaker said that all men of militia age, 20 to 40 years, do not work nearly as hard as they could. If Day, Taylor and Gantt could get at

them they would do six and eight fold more. Piece work is an acknowledgment on the part of the manager that he cannot get all he should out of his men, and he therefore gives them a prize. The fault of small and inadequate output rests with the manager and not with the men.

List of Members.

Abercrombie, James Henderson, mechanical superintendent Clark Thread Company, Newark, N. J.
Alden, George I., mechanical engineer Norton Emery Wheel Company, Worcester, Mass
Ashton, Albert Carter, secretary and treasurer the Ashton Valve Company, Boston.
Baldwin, Stephen W., New York agent Pennsylvania & Maryland Steel Companies, New York.
Bartlett, Henry, superintendent motive power, Boston & Maine Railroad, Lowell, Mass.
Beach, Charles S., experimental machinery, Bennington, Vt.
Beck, Mathias A., chief engineer Pawling & Harnischfeger, Milwaukee, Wis.
Blackall, Robert C., superintendent machinery Delaware & Hudson Canal Company, Albany, N. Y.
Blessing, James H., Albany Steam Trap Company, Albany, N. Y.
Bolles, Frank G., manager foreign sales, Bullock Elec. Mfg. Company, Cincinnati.
Bond, George M., Hartford, Conn.
Brandon, Geo. Russel, mechanical engineer Whiting Foundry Equipment Company, Chicago.
Brown, John Rowland, engineer of tests, Aultman & Taylor Machinery Company, Mansfield, Ohio.
Brown, Robert S., secretary, New Britain Machine Company, New Britain, Conn.
Bruegel, Adolphe Theodore, professor of mechanical engineering, Drexel Institute, Philadelphia.
Bullard, Edward Payson, president, the Bullard Machine Tool Company, Bridgeport, Conn.
Burden, Jas. A., president, Burden Iron Company, Woodside, Troy, N. Y.
Caldwell, Andrew J., general superintendent, Crane Company, Chicago.
Capp, John Alien, chief of test laboratory, General Electric Company, Schenectady, N. Y.
Carney, Chas. Joseph, superintendent machinery, Brooks Locomotive Works, Dunkirk, N. Y.
Colby, Albert Ladd, metallurgical engineer, Bethlehem Steel Company, South Bethlehem, Pa.
Cole, Francis J., assistant mechanical engineer, American Locomotive Company, Schenectady, N. Y.
Cole, J. Wendell, district manager, Detroit Emery Wheel Company, Columbus, Ohio.
Colt, Samuel Gilbert, mechanical engineer, Stanley Elect. Mfg. Company, Pittsfield, Mass.
Comly, Geo. N., engineer, Solvay Process Company, Syracuse, N. Y.
Cooke, Harte, assistant engineer, McIntosh, Seymour & Co., Auburn, N. Y.
Coon, J. S., professor mechanical engineering, School of Technology, Atlanta, Ga.
Corey, Fred. Brainard, engineer, General Electric Company, Schenectady, N. Y.
Cullen, James K., secretary, Niles Tool Works, Hamilton, Ohio.
Dalton, William, shop engineer, American Locomotive Company, Schenectady, N. Y.
Day, Charles, engineer of works, Link-Belt Engineering Company, Philadelphia.
Dodge, Jas. M., president, Link-Belt Engineering Company, and president Dodge Coal Storage Company, Philadelphia.
Eberhardt, Henry J., Gould & Eberhardt, Newark, N. J.
Ely, Wm. Grosvenor, Jr., superintendent construction, General Electric Company, Schenectady, N. Y.
Emmet, W. L. R., engineer, lighting department, General Electric Company, Schenectady, N. Y.
Fernald, Robt. H., professor mechanical engineering, Washington University, St. Louis, Mo.
Forsyth, William, *The Railway Age*, Chicago.
Fox, William, assistant professor physics, College of the City of New York, New York.
Gantt, Henry L., cons. engineer, American Locomotive Company, Schenectady, N. Y.
Golden, M. J., professor practical mechanics, Purdue University, Lafayette, Ind.
Gorton, John C., manager, Chicago Pneumatic Tool Company, Cleveland, Ohio.
Goss, W. F. M., dean, Schools of Engineering, Purdue University, Lafayette, Ind.
Gould, Webster V., New York representative, Jones & Lamson Mach. Company, Mt. Vernon, N. Y.
Gridley, George O., superintendent, Windsor Mach. Company, Windsor, Vt.
Halsey, F. A., *American Machinist*, New York.
Hammett, Hiram G., Hammett Mach. Works, Troy, N. Y.
Hannah, Fredk. Augustus, Crosby Steam Gauge & Valve Company, Medford, Mass.
Henshaw, Frederick V., Crocker-Wheeler Company, Ampere, N. J.
Hewlett, Edward M., engineer of switchboard department, General Electric Company, Schenectady, N. Y.
Hibbard, H. Wade, professor of mechanical engineering of railways, Sibley College, Cornell University.
Higgins, John W., Plunger Elevator Company, Worcester, Mass.
Hoffman, James David, assistant professor machine design, Purdue University, Lafayette, Ind.
Hunt, Charles Wallace, New York.
Hutton, Frederick R., professor mechanical engineering, Columbia University, New York.
Hyde, Charles E., marine engineer, Bath Iron Works, Bath, Maine.
Jacobs, Ward S., mechanical engineer, the Phœnix Iron Works Corporation, Hartford, Conn.
Jacobus, D. S., professor experimental mechanics, Stevens Institute, Hoboken, N. J.
Jennings, Edward M., cons. engineer, Parsons Mfg. Company, Boston.
Jones, David Todd, superintendent Pennsylvania Iron Works Company, Philadelphia.
Keller, Emil E., vice-president, Westinghouse Machine Company, East Pittsburgh, Pa.
Kent, Wm., *Engineering News*, New York.
Kimball, Dexter Simpson, works manager, Stanley Elec. Mfg. Company, Pittsfield, Mass.
King, Chas. C., chief engineer, C. W. Hunt Company, New Brighton, N. Y.
Kirchhoff, Charles. *The Iron Age*, New York.
Knickerbacker, John, president, Eddy Valve Company, Waterford, N. Y.
Kruesi, August H., designing engineer, General Electric Company, Schenectady, N. Y.
Landreth, Olin H., professor of engineering, Union College, Schenectady, N. Y.
Lane, Francis W., *The Railway Age*, Chicago.
Lodge, Wm., president, Lodge & Shipley M. T. Company, Cincinnati.
Logan, John D., superintendent, Logan Iron Works, Brooklyn.
Low, Fred. R., *Power*, New York.
Lyman, James, assistant manager Western district, General Electric Company, Chicago.
McClelland, E. S., chief draftsman, Westinghouse Machine Company, Pittsburgh.
McGeorge, John, chief engineer, Wellman-Seaver Engineering Company, Cleveland, Ohio.
McGill, Chas. Fredk., mechanical superintendent, Canadian General Electric Company, Peterboro, Ontario, Canada.
Mackintosh, Frederick, electrical engineer, General Electric Company, Schenectady, N. Y.
Mann, A. S., mechanical engineer, General Electric Company, Schenectady, N. Y.
Mason, William B., superintendent, Mason Regulator Company, Dorchester, Mass.
Mayo, John B., Coe Brass Mfg. Company, Torrington, Conn.
Meier, E. D., president, Heine Steam Boiler Company, New York.
Mellin, Carl J., chief engineer, Richmond L. & M. Works, Richmond, Va.
Miller, Fred. J., *American Machinist*, New York.
Mortensen, Caspar, foreman, turbine department, General Electric Company, Schenectady, N. Y.
Norris, Henry McCoy, works manager, Bickford Drill & Tool Company, Cincinnati.
Osgood, John L., manager Buffalo Branch, Niles-Bement-Pond Tool Company.
Park, William R., superintendent, Hancock Inspirator Company, Boston.
Parks, Edward H., mechanical engineer, Brown & Sharpe Mfg. Company, Providence.
Parsons, Frederick W., superintendent, Rand Drill Company, Tarrytown, N. Y.
Patitz, J. F. Max, Allis-Chalmers Company, Milwaukee, Wis.
Pearson, Hiram, chief engineer, General Electric Company, Schenectady, N. Y.
Pearson, Wm. Anson, Jr., mechanical engineer, General Electric Company, Schenectady, N. Y.
Pitkin, A. J., superintendent, Schenectady Locomotive Works, Schenectady, N. Y.
Potter, William Bancroft, chief engineer, railway department, General Electric Company, Schenectady, N. Y.
Power, Fredk. Macy, general superintendent, Solvay Process Company, Syracuse, N. Y.
Quereau, C. H., superintendent of shops, N. Y. C. & H. R. R. R., West Albany, N. Y.
Reeder, N. S., mechanical engineer, Pressed Steel Car Company, New York.
Reist, H. G., mechanical and electrical engineer, General Electric Company, Schenectady, N. Y.
Reynolds, Irving H., chief engineer, Allis-Chalmers Company, Milwaukee Works.
Ricketts, Palmer Chamberlaine, professor mechanics, Rensselaer Polytechnic Institute, Troy, N. Y.
Riddell, John, mechanical superintendent, General Electric Company, Schenectady, N. Y.
Rohrer, Albert L., electrical superintendent, General Electric Company, Schenectady, N. Y.
Rushmore, David B., electrical engineer, Stanley Elect. Mfg. Company, Pittsfield, Mass.
Sanders, Newell, president and manager, Chattanooga Plow Company, Chattanooga, Tenn.
Shantz, Oliver S., engineer, Rand Drill Company, New York.
Slichter, Walter I., electrical engineer, General Electric Company, Schenectady, N. Y.
Smith, Chas. F., mechanical engineer, Geo. A. Fuller Company, New York.
Smith, Ephraim, Colonial Steel Company, New York.
Smith, Oberlin, president, Ferracute Machine Company, Bridgeton, N. J.

Snow, Wm. W., president, Ramapo Foundry Company, Hillburn, N. Y.
Snyder, Wm. Emery, mechanical engineer, Shoenberger Steel Works, Pittsburgh, Allegheny, Pa.
Spangler, H. W., professor mechanical engineering, University of Pennsylvania, Philadelphia.
Stillman, F. H., the Watson-Stillman Company, New York.
Street, Clement F., manager railway department, Wellman-Seaver-Morgan Engineering Company, Cleveland, Ohio.
Sturgess, John, general manager, Sturgess Governor Engineering Company, Watervliet, N. Y.
Swasey, Ambrose, the Warner & Swasey Company, Cleveland, Ohio.
Sweeney, John M., Steel Cable Engineering Company, Chicago.
Sweet, John E., president, Straight Line Engine Company, Syracuse, N. Y.
Taylor, Fred. W., consulting engineer, Philadelphia.
Uehling, Edward A., Uehling, Steinbart & Co., Passaic, N. J.
Van Dervort, Adrian O., superintendent, Hammett Machine Works, Troy, N. Y.
Veeder, Curtis H., president Veeder Mfg. Company, Hartford, Conn.
Waitt, Arthur M., superintendent, M. P. & R. S., N. Y. C. & H. R. R. R., New York.
Waldron, Fred. A., superintendent power plant, Yale & Towne Mfg. Company, Stamford, Conn.
Walworth, Arthur C., president, Walworth Construction & Supply Company, Boston.
Webber, Samuel S., manager, Trenton Iron Company, Trenton, N. J.
Webster, Hosea, Babcock & Wilcox Company, New York.
Whitehead, George E., superintendent, R. I. Tool Company, Providence, R. I.
Whitlock, R. H., professor mechanical engineering, Texas State Agricultural and Mechanical College, College Station, Texas.
Wiley, Wm. H., New York.
Winther, Chas. A. G., superintendent, Chapman Valve Mfg. Company, Indian Orchard, Mass.
Wyman, Horace Winfield, Wyman & Gordon, Worcester, Mass.

"Roasts."

In the ballroom of the United States Hotel, Wednesday evening, the members and visitors heartily enjoyed an informal entertainment of the Jest and Song Club of Schenectady. The General Electric Company have in their employ more college graduates than any other manufacturing concern in the United States. The club presenting this entertainment was composed almost exclusively of young collegians, who carried off their parts with the greatest success, due probably to the experience they had during college days. The performers were made up in the good old fashioned minstrel style, having the almost forgotten interlocutor in the center, with the usual bones and tambourine at the end. Interspersed betwen the musical selections were certain allusions to prominent members of the society, almost all of whom were present. Some of these we present below:

Mr. Barratt, do you know Mr. Kent?
What Mr. Kent?
The author of Kent's Engineers' Pocket Book.
Yes, I know him.
Well, he's going to Syracuse—the boodle town.
What for?
Why, to enlarge his pocketbook, of course.

Mr. Barratt, did you ever hear of that miracle in the Bible where a woman was turned to salt?
Oh, yes, I am familiar with that.
Mr. Barratt, I saw a bigger miracle than that to-day.
How was that?
Well, there was a pretty girl going along Broadway, and I saw Oberlin Smith turn to rubber.

Jim, do you know the longest and the shortest person of this association?
Why, yes. Professor Jacobus and Gus Henning.
Well, that is right; but which is the long one and which is the short one?
Professor Jacobus is the long one and Gus is the short one.
Oh, no, you have got that wrong. Gus talks a great deal longer than the professor does.

Jim, who is the politest man belonging to the society?
Why, Mr. Rohrer, of course.
What makes you think so?
I was on the trolley to-day and I saw Mr. Rohrer give up his seat to a lady.
Well, Mr. Barratt, I know a man who is twice as polite as that. I took a ride in a trolley to-day and I saw C. W. Hunt give up his seat to two ladies.

Mr. Barratt, I am sorry to say that this afternoon I saw Professor Jacobus down in the bar of this hotel.
You did! What was he doing down there?
He said he was getting points on a new paper he is going to present at the next meeting.
Well, what is the title of the paper he is going to read?
It is on the "Loss of Head Due to the Flow of Liquids Through an Orifice."

Bones, do you know it is too bad that Mr. Darwin died so soon?
No, I didn't. Why?
Well, if he had only lived long enough and come over here he could have got the missing link from James M. Dodge.

Mr. Barratt, I saw C. E. Sargent coming back from the lake to-day, and he said he had caught 2000 fish.
You didn't believe him, did you?
Why, I had to. He had his "anglemeter" along with him to prove the record.

Mr. Barratt, have you read that paper by John B. Blood on "Rational Train Resistance Formula?"
Certainly; enjoyed it very much.
Did you find any fault with it?
Oh, nothing much, only that man never wrote anything rational in his whole life.

Mr. Barratt, this is my first visit to Saratoga Springs. What places ought I to visit?
Well, there is Mount McGregor, where General Grant was sick; Saratoga Lake, the race course, the springs—oh, there's lots of things you can take in.
Well, I guess I will take in the springs first.
Well, that's all right, Jim. If you take in the springs first you won't see any of the rest.

Mr. Barratt, I have got a conundrum for you.
Well, Jim, I like conundrums. What is it?
Why is a mouse when it's spinning?
Why is a mouse when it's spinning? I give it up.
So do I.
What do you mean? Where did you get that anyhow?
Mr. Barratt, now listen, and I will tell you. Professor Hutton came to me privately and told me earnestly to spring that on the audience to-night because it was a good one.

Mr. Barrett, do you notice that every member has a badge in his buttonhole with a number on it?
Yes, I notice that.
Do you know what those numbers mean?
No.
Well, those are the numbers of the rooms of the different members, and they wear them so that if they are caught out late at night the cops will know where to take them.

Excursions.

On Friday the members visited the plant of the Schenectady Locomotive works, where they saw the benefits arising from Mr. Gantt's method of keeping a graphical daily balance of all that is going on in the works. Having studied the paper, the visitors were better able to appreciate the advantages of the system.

A visit was also made to the General Electric Company, where the Riddell 60-foot boring and turning mill was shown in operation. Much time was also spent in the department devoted to the manufacture of the Curtis steam turbine.

The Asbestos Mfg. Company.—Plans have been completed by the Asbestos Mfg. Company of Philadelphia, Pa., for a new plant, to be constructed at Port Kennedy, Montgomery County, Pa. The total cost of the plant will be about $250,000. The buildings will be constructed entirely of stone and will consist of a three-story main shop, 67 x 265 feet; a boiler house, 20 x 30 feet; a dryer house, 40 x 80 feet, and a four-story elevator building, 30 x 60 feet. The buildings will contain the most modern equipment, and it is expected will be in operation before the close of this year. The principal contract for the buildings will be awarded within a few days. The company own an extensive tract of land at Port Kennedy, from which they quarry the dolomite rock which is to be used in the process of manufacture. The new plant will produce carbonate of magnesia and various other products manufactured therefrom, such as 85 per cent. magnesia steam pipe covering, magnesia cement, &c. The manufacture of their present line of asbestos materials, including pipe and boiler coverings, building and roofing papers, &c., will also be continued by the company. The plant is designed to produce 30,000 pounds of pure carbonate of magnesia daily. Good railroad facilities are afforded by the Philadelphia & Reading Railroad, who are placing sidings and spurs running directly into the new works. The officers of the company are as follows: President, Michael Ehret; vice-president and treasurer, Alvin M. Ehret; secretary, Alonzo Gibbons; general manager, George P. Wilson. The officers, together with Harry S. Ehret, form the Board of Directors.

Lake Superior Iron Company's Fiftieth Anniversary.

Features of the Celebration.

ISHPEMING, Mich., June 28, 1903.—The event of Lake Superior iron mining circles the past week was the celebration of the fiftieth anniversary of the Lake Superior Iron Company, which was held at the company's headquarters at Ishpeming, Marquette Range, Mich. Not only were there present some 10,000 people from the surrounding mining region, but many leading officers of the United States Steel Corporation's mining end were there. Among these were James Gayley, head of the corporation's mines and transportation interests; T. F. Cole, president; N. P. Hulst, vice-president; W. J. Olcott, manager, and L. W. Powell, assistant to the president, all of the mining corporations; D. M. Clemson and A. B. Wolvin, president and vice-president of the steamship interests; D. G. Kerr, ore agent, and C. D. Frazer, secretary. Addresses were made by Messrs. Gayley, Cole, Congressman O. H. Young, who began his business career as weigher for the company; the venerable Peter White, who is a mine of reminiscence of early day mining and pioneering, and others. The festivities covered a barbecue at which 10,000 persons were served amply, athletic games characteristic of mine and timber localities, and a ball for the close.

A most interesting feature was the presentation of "long service" certificates, made to old employees of the Lake Superior Iron Company. Employees who had been with the company from 10 to 40 or more years, to the number of 222, received service certificates and money in proportion to the length of their terms of work. Three who had been in its employ for more than 40 years received $100 each and the hearty praise of the officers. It is a most remarkable thing that 222 persons have been employed, practically continuously, by this company for more than ten years, through good times and bad, when conditions scarcely seemed to warrant the employment of anyone at all, without strikes or labor troubles, and satisfactorily to all concerned. W. H. Johnson, manager of the mines, and to whose initiative the celebration was largely due, has himself been an employee for more than 30 years.

In the course of his remarks Mr. Gayley drew a picture of the advancement of the iron industry since this company began their career. He painted graphically their magnificent changes in the industry since the crude beginning of the development of the Lake Superior country to its present wonderful achievements.

The 50 years measured a half century of miraculous advancement in every line of human endeavor. He added some statistics of the industry and of the *per capita* consumption of iron. Mr. Gayley then reverted to the transformation of late years in corporate organization typified by the company operating the Lake Superior Iron Company. He sketched the development of business association up to the United States Steel Corporation, and closed by the remark that they stand for all that is best in industrial enterprise, and that in them are found all the element of strength and stability, a statement that very few of his listeners would care to deny, reviewing events of their own knowledge.

Hiram Burt, son of the original patentee of the lands of the company, was called upon, and reminded the company that this year was also the fiftieth anniversary of the opening of the first Sault canal and the building of the Iron Mountain Railway. He also described the manner in which the original papers were lost in fire and storm on Lake Superior.

President T. F. Cole, of the mining companies, said that it was a constant pleasure for him to be associated with the employees of this company. Harmony and good feeling prevail in their ranks to a degree unexcelled, but possible almost everywhere. The company recognize their indebtedness to the laborer in the mine, the artisan and the mechanic, and it is always a pleasure to be able to say to one of these who has done well "Come up higher." The company recognize ability by choosing men for high positions from their own ranks, and regard the man who has forced his way up with fully as much feeling as he who may come in from outside, however highly skilled the latter may be. It is plainly enough the sentiment of this company that the man who does things is advanced whether he be a graduate of the tramcar or of a technical school.

Mr. Cole referred to conditions of wage earners now and before the organization of the Steel Corporation. He reminded his auditors of former methods, when Eastern iron manufacturers used to send their agents through the mining regions to inspect stock piles, and how, on the reports of these agents, prices would be offered, frequently to the great disadvantage of the mining companies.

Telegrams of regret at inability to be present, sent by President Roosevelt and others, were read.

History of the Company.

The Lake Superior Iron Company were the second to engage in the mining of ore in the city of Ishpeming and the third in the State of Michigan. They were preceded by the Jackson at Negaunee and the Cleveland at Ishpeming. The property was formerly known as the Burt, and is still often called by the old name by old timers, who remember the strong personality of Mr. Burt and the stories of how the mine was first found, how the gift of a bottle of whisky to an Indian led the way to a discovery that has since produced more than 11,500,000 tons of high grade iron ore, and become one of the great factors in the industrial development of the Northwest and the nation. The company was originally formed to develop lands embraced in the bounds held by the Marquette Iron Company, who had been organized in 1848, and for the protection of whose interests a party was sent out in the spring of 1849. Of this party the Hon. Peter White, then a youth, was one.

In 1853 the Lake Superior Iron Company were organized, but they did not actually mine ore for four years. Among their incorporators were the Elys of Marquette and Cleveland, well-known mining men of a generation now passing away; Anson Gorton of Marquette, and Alvah Strong of Rochester, N. Y. On October 10, 1857, the first carloads of ore to be sent out were shipped to the lake over the Marquette, Houghton & Ontonagon road, a line which is now a portion of the Chicago & Northwestern. Ore shipping of that day was as far removed from the same operation to-day as 5-ton cars are from 50-ton cars, as hand power is from air drills, black powder from dynamite, or oxen and horses from mammoth steam hoists. At that time all these operations, now so primitive as to seem almost prehistoric, were under way at the Lake Superior and their two infantile neighbors.

The first ore mined was the boulders of iron lying in the outcropping jasper and other rocks of the ore-bearing formation. All mining was upon the hilltops and it was some time before it began to be realized that the great bulk of ore was in the valleys. For many years the product was a hard ore; now, on the contrary, the great bulk of it is soft. In 1858, when the first ore was sent to lower lake ports, it was just 14 years after the original openings for the Lake Superior country had been made at the Jackson property, at the neighboring hamlet of Negaunee. Since that time the company have been continuous and continually increasing shippers, and their last year's product of 833,000 tons was the largest in their history. Such a record at the end of a 50 year career is an indication of management of a very high order.

The company have always been most carefully and conservatively managed, have been a bright point in the industrial world, and have been stanch supporters of the city of Ishpeming and the Marquette Range. Their name has always been synonymous with honesty of dealing to all, and with earnestly progressive, though conservative, management. Their properties have been busy winter and summer alike, day and night, and their paydays have never failed. They have educated some of the most prominent mining men of the world, and their graduates are scattered world wide. They own in fee their mines and 16,000 acres besides. They were the first company to use high explosives, to adopt electric lighting under ground, or to put steam shovels into their stockpiles. They began to produce soft ores in 1867, but such was the feel-

ing of furnace managers that years of education were needed to overcome the prejudice against these ores.

Until 1874 this company did all their mining in open pits, which then became too deep for the continuance of such a practice and underground openings were made. It is natural that many of the original openings should be worked out. This is the case with the old mine Hematite, and the Hard Ore Mine, where first mining was done, has been furnishing comparatively very little ore for some years. In time the pillars will be sliced down, the floors removed and the mine finally abandoned, but not until all possibility of the discovery of more deposits has been thoroughly attempted. Nos. 2 and 3 shafts are practically cleaned out now, and Shaft A is full of water. The Lake shafts and the Section 16 mine are considerable producers, making both Bessemer and non-Bessemer ores and some manganiferous. Section 21 mine, located a considerable distance from the other openings of the company, is a large producer and will be such for many years to come.

One of the great operations carried on by this company and the Lake Angeline mine adjoining it was the pumping of Lake Angeline in order to secure the tonnage of good ore lying beneath. The lake was large and the task of pumping it occupied many months. Under its waters was a deposit of creamy mud some 15 feet thick, and keeping this from the ore as the surface caved required all the skill of the mine's management. The task was no slight one, and it was done at a time when there was no margin sufficient to permit heavy expense.

In such a retrospect as this it is interesting to note the wages paid at various periods, and it is also instructive to contrast those wages and their purchasing power with corresponding figures of the present. In 1857, when the first mining was undertaken by this company, its daily wages rate for miners was 75 cents, the foreman being paid $1. In the early days of the Civil War wages ran from $1 to $1.50, but near the close of the war they naturally ran higher. During the panic of 1873 they dropped back to $1.30 to $1.40. To-day the average day's pay for miners is not far from $2.50. In 1856 the cost of provisions, as taken from mercantile books of that time at Ishpeming, was as follows for staple items: Sugar, 13 cents a pound; syrup, $1.25 a gallon; pork, $30 a barrel; flour, $8.50 a barrel; kerosene, $1 a gallon. Cotton cloths and garments generally were at about the same relative proportion above common prices to-day.

From the dozen men worked 50 years ago this company has frequently risen to payrolls of far more than 1000, and it is now a part of a mining organism employing to-day 14,000 men.

The Lake Superior Iron Company are capitalized for $2,500,000, of which three-fourths is held by the United States Steel Corporation and the remainder by the Cleveland Cliffs Iron Company, but their management is in the hands of the majority interest exclusively. D. E. W.

Nickel Steel Noncorrosive Boiler and Condenser Tubes.

Among the novelties of the Saratoga Railroad Conventions, which came to a close this week, the noncorrosive seamless steel tubes exhibited by the Shelby Steel Tube Company deserve special mention on account of their evident practical advantages.

These high nickel steel boiler and condenser tubes have proved very satisfactory during their trial for the past two years by the German, French and Dutch navies, and have been submitted to a severe series of tests by A. F. Yarrow, one of the prominent English builders of torpedo boats and the patentee of the Yarrow marine boiler.

Partly from information obtained from the German and French makers of these tubes, all the difficulties of their manufacture have been overcome, for, as is shown by their exhibit, the Shelby Company are now in a position to furnish all sizes of these tubes from ⅝ to 4 inches diameter, and of any desired gauge, for locomotive, marine and stationary boilers; also a full line of condenser tubes.

The Bethlehem Steel Company of South Bethlehem, Pa., furnish the 30 per cent. nickel steel used in the manufacture of these tubes. Fig. 1 shows the tests made to prove to the United States Navy authorities, who are about to place some of these tubes in marine boilers, that these nickel steel tubes will stand all the severe manipulating tests now required in the United States Navy specifications for soft carbon seamless tubes. This high nickel steel can be welded so that these tubes can be "safe ended" when desired, and they can be as readily "beaded" as the ordinary seamless or lap-welded tube, but owing to the toughness of the metal, the tensile strength and elastic limit of which is almost double that of the iron tube, there will be a much tighter joint at the tube sheet, with less leaky tube ends, and a corresponding decrease in the amount of safe ending required.

The increased initial cost of these high nickel steel tubes is fully offset by the following advantages:

1. Obtaining a practically noncorrosive tube, thus avoiding the expense of the frequent renewals due to the pitting of both iron and low carbon steel tubes.

2. Increased strength over iron and steel tubes, thus allowing, without risk, the use of a tube of lighter gauge, which insures a saving in the original weight and cost as well as an increase in steaming efficiency.

3. The tubes, when they finally are taken out of the boiler, can be sold to steel companies making nickel steel at the market price of steel tube scrap, plus 20 cents per pound for the contained nickel.

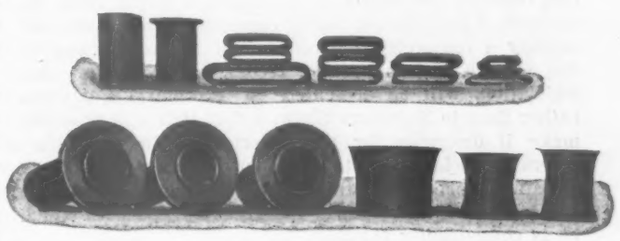


Fig. 1.—Tests of Nickel Steel Boiler Tubes.

These nickel steel tubes are just about to be placed on trial in locomotive boilers, stationary boilers and marine boilers. This application for high nickel steel, only just introduced to the American public, is destined, on account of its evident merits, to become an important practical factor in the trade.

The Customs Congress and the Metric System.

The issue of *Treasury Decisions* for June 25 contains a full report of the resolutions adopted by the first Customs Congress of the American Republics at their meeting in this city last February under the auspices of this Government. The countries represented were Bolivia, Cuba, Ecuador, El Salvador, Guatemala, Honduras, Mexico, Nicaragua, Peru, United States, Uruguay and Venezuela. The resolutions refer mainly to custom house regulations which need to be simplified as much as possible, but among them appears the following relative to the metric system:

> The committee voted unanimously in favor of the adoption of the metric system, believing it to be the more easily adapted to general use and that its adoption would accomplish economy in the handling of commodities internationally. The metric system being in use in all the custom houses of the South American Republics at present, and the customs service of the United States annually expending large sums for the translation of metric equivalents into the terms of weights and measures now in use in this country, the committee believes that the common adoption of the metric system would be of great advantage in a practical business way and recommends that this Congress earnestly strive to accomplish that end.

Cement Interests in the Shenango Valley.—The manufacture of cement and its products is becoming of great importance in the Shenango Valley. For several years the Wampum Cement Company have been operating two large mills at Wampum, Lawrence County. A plant has recently been started most successfully there for making sewer tile from Portland cement. At New

Castle and Sharon plants are being started for making building tile from the same material, the names of the concerns being the Sharon Artificial Stone Company and the New Castle Artificial Stone Company. The Stewart Iron Company have started a large cement plant at Sharon, using limestone and furnace slag for its manufacture. At New Castle George Greer, Edward N. Ohl, E. F. Norris, E. I. Phillips and others connected with the iron and limestone interests of the city have applied for a Pennsylvania charter for the Pennsylvania Portland Cement Company, which will have a cash capital of $1,250,000, and will erect the largest Portland cement plant in the world, according to the local press. This company have almost an ideal location at a great limestone field, east of New Castle, and will have connection with all the railroads entering the Shenango Valley.

Transfer of Steamboat Inspection.

Board of Inspectors to Report to New Department.

WASHINGTON, D. C., June 30, 1903.—The Steamboat Inspection Service, heretofore a bureau of the Treasury Department, will be transferred to the Department of Commerce and Labor to-morrow, July 1. As a result of this transfer, the report of the Board of Supervising Inspectors, which is now nearly completed and which will embody a comprehensive revision of the regulations of the service and important recommendations for new legislation, will be presented to Secretary Cortelyou rather than to Secretary Shaw, a fact that will probably make it desirable for the American Boiler Manufacturers' Association to take up with the new Secretary certain important questions which they have heretofore laid before the Secretary of the Treasury and with which he is consequently familiar.

When the boiler manufacturers first undertook to secure the enactment of a law authorizing the appointment of an expert commission to revise the boiler regulations they presented the matter to Secretary Shaw and secured his hearty co-operation. Supervising Inspector General Dumont favored the plan, and the prompt action of the Senate was predicated upon the indorsement of the Treasury officials. Since the Board of Supervising Inspectors was convened in special session Secretary Shaw has received a number of communications from boiler manufacturers reminding him of his promise to aid in securing authority from Congress for the appointment of an expert commission to revise the laws and regulations, and it is only fair to assume that if the Steamboat Inspection Service had not been detached from the Treasury Department the Secretary would have repeated to the next Congress the recommendations which he sent to the House and Senate last winter. The service will pass out of his control to-morrow, however, and except as he may favor Secretary Cortelyou with his unofficial advice, Secretary Shaw will have nothing further to do with the projected revision.

It is anticipated that the board will be ready to make its report to Secretary Cortelyou within the next week or ten days. As heretofore stated, the recommendations will include, first, as comprehensive a revision of the regulations as can be made without changing the statutes on the subject; and, second, a proposition to repeal all those provisions of existing law which contain specifications with reference to the construction and inspection of boilers and the enactment of an amendment clothing the board with full authority to prescribe all specifications by regulation. This plan takes no account of the project of the boiler manufacturers for the appointment of an expert commission. When the board's report is laid before Secretary Cortelyou, however, an opportunity will be afforded the American Boiler Manufacturers' Association to take the matter up, and it is likely that a full hearing will be given both the manufacturers and supervising inspectors before the Secretary decides on his recommendations to Congress. Manufacturers who are interested in this matter would do well, however, to bring it to the attention of Secretary Cortelyou in order that no action of any kind shall be taken by the officials of the new department upon the report of the Board of Supervising Inspectors before the other side has been accorded a hearing.

Views of Naval Experts.

The experts of the Bureau of Steam Engineering of the Navy Department are taking a lively interest in the proposed revision of the laws and regulations, and have been called upon within the past week to furnish the Board of Supervising Inspectors with the specifications covering the boilers and material which are now in force upon naval work. These specifications have been forwarded to the Board and are now being very carefully considered. As the Navy Department has designed no Scotch boilers within the past three years, the latest specifications are those employed in the case of the battle ship "Indiana" and class. These specifications indicate graphically, however, the progress made in boiler construction since the statutes relating to the Steamboat Inspection Service were enacted. The only joint recognized in the statutes is the common double-riveted lap, whereas the naval specifications with regard to riveted joints provide as follows:

For the double ended boilers the longitudinal joints of boiler shells will be butted, with 1-inch straps inside and outside, and triple riveted. Joints of heads with shells, except curved portion, will be double riveted. Joints in furnaces and combustion chambers will be single riveted. For the auxiliary boilers the longitudinal joints of boiler shells will be butted with 19-32-inch straps inside and outside, and triple riveted. Circumferential joints will be lapped and double riveted, and joints in furnaces and combustion chambers will be single riveted. Rivets will be of Clapp-Griffith steel. Edges of all plates in cylindrical shells, and of all flat plates where not flanged, will be planed. Edges of flanges will be faired by clipping or otherwise, as may be approved. Plates in cylindrical shells must not be sheared nearer the finished edge than one-half the thickness of the plate along the circumferential seams, and not nearer than one thickness along the longitudinal seams. No plate must average less than the specified thickness along the longitudinal seams. All rivet holes in shell plates will be drilled wherever possible. In parts where hydraulic riveting cannot be used, the rivet holes will be coned and conical rivets used. Seams will be calked on both sides in an approved manner. Longitudinal seams will break joints.

A Compromise Plan.

The officials of the Bureau of Steam Engineering have suggested a compromise between the plans of the Board of Supervising Inspectors and the American Boiler Manufacturers' Association, which may possibly be adopted. A prominent officer of the bureau in discussing the matter said to the correspondent of *The Iron Age:*

The Department is heartily in accord with the boiler manufacturers' proposition that the requirements concerning the construction and inspection of boilers should be carefully revised by an expert commission. It will be very important to the navy to have proper representation on such a commission, for in view of the laws under which merchant vessels now become auxiliaries in time of war it is necessary that there should be uniformity in all the requirements relating to boilers used either in the merchant marine or the naval service. The antiquated character of many of the regulations now incorporated in the laws governing the Steamboat Inspection Service is well known abroad and is a constant source of annoyance whenever it becomes necessary to have repairs made. In revising the regulations, therefore, every care should be taken to bring them not only up to date, but into harmony with the best foreign practice.

While the Department approves the plan for an expert commission, it is also disposed to favor the suggestion of the Supervising Inspectors that all details or specifications in the present statute should be eliminated and not incorporated in a new law. It frequently takes several years to get an important bill through Congress, even with the influence of an executive department behind it, and it would be very unfortunate if the proposed revision should be enacted into law, for it is safe to assume that the progress of a few years would again render many provisions obsolete. It would, therefore, seem to be wise to adopt the expert commission plan of the manufacturers, but to incorporate the results of the revision in regulations rather than in hard and fast statutes of Congress.

The plan suggested by the naval officials does not contemplate the superseding of the Board of Supervising Inspectors by an expert commission. It is assumed that it would not be necessary to convene such a commission oftener than once in four or five years, and that the Board of Supervising Inspectors would be fully represented upon it. The regulations would be under the control of the board during the interval between meetings of the commission and would be subject to amendment at the annual conferences held by the board in Washington.

W. L. C.

Notes from Great Britain.

The Markets.

LONDON, June 20, 1903.—The policy systematically pursued for some months past by the consumer has been successful, for prices of raw iron have slackened all along the line. Scottish iron has fallen in value 8 per cent., Cleveland 10 per cent., while the fall in Lancashire and in Welsh hematite is over 6 per cent. This weakening of the market, while mainly due to the persistent policy of the consumers in buying from hand to mouth, is in part due to the reaction reported from the United States. It is believed by makers of all grades that there will be no strong demand from America from now on, and that, on the contrary, it is quite possible within a few months that American products may be marketed in this country at competitive prices.

The present is a striking example where the market is depressed and weak, while the demand for raw iron, notwithstanding the coyness of buyers, is fully equal to the supply. It is thought that there is enough demand in the market to maintain a maximum output to the end of September. Indeed, the output of pig iron and steel in the country generally is on an exceptionally large scale, the output of pig iron from imported ores alone for the first five months of the present year having been at the rate of 120,000 tons a year in excess of the corresponding consumption of foreign ores in the first five months of 1902. This would mean that up to the present time the make of pig iron in Great Britain for the year 1903 has been at the rate of fully 8,500,000 tons a year.

Another feature that has recently developed is the reappearance of German competition. German steel billets are now being freely offered at £4 12s. 6d., but £4 10s. is good enough for a contract. Other kinds of European material indicate easier prices.

As to the future, the consumption of iron in our own industries is going on at a rapid rate. Only in the shipbuilding centers is there any sign of slackness, and even there it is not very serious, though, apart from the coming contracts for war vessels and orders by some of the large ocean steamship companies, the inquiry for new shipping is far from active. But the demand for railway material, for electrical plant, for engineering and structural iron and steel continues abundant for both the home and the foreign and colonial markets. It would seem, therefore, although trade is not brilliant nor is likely to become particularly so, yet a fair trade may be done for a few months to come. The fact that the consumer has at the moment the upper hand may in itself stimulate the production of manufactured goods. Prices to-day are as follows:

Pig Iron: Scotch warrants, 52 shillings; Middlesbrough, 46 shillings 2½ pence. Forge qualities: Staffordshire cinder, 48 to 49 shillings; part mine, 49 to 50 shillings; cold blast, 95 to 100 shillings; Northamptonshire, 47 shillings 6 pence to 48 shillings 6 pence; Derbyshire, 50 to 51 shillings; North Staffordshire, 51 to 52 shillings; Lincolnshire, 53 shillings 1 penny.

Finished Iron: Marked bars, £8 10s.; Earl of Dudley's brand, £9 2s. 6d.; second grade, £7 10s.; common unmarked bars, £6 5s. to £6 10s.; North Staffordshire bars, £6 15s.; angles, £6 15s. to £7; sheets, singles, £7 2s. 6d. to £7 5s.; doubles, £7 5s. to £7 7s. 6d.; trebles, £7 17s. 6d. to £8; galvanized corrugated sheets, f.o.b. Liverpool, £11 5s. to £11 10s.; hoop iron, £6 17s. 6d. to £7 2s. 6d.; nail rod and rivet iron, £7 5s. to £7 10s.; gas strip, £6 12s. 6d. to £6 15s.

Steel: Bessemer billets, £4 15s. to £5; Siemens billets, £4 17s. 6d. to £5 2s. 6d.; mild steel bars, £6 12s. 6d. to £7 2s. 6d.; steel plates, £6 5s. to £7; steel girders, £6 to £6 5s.; steel angles, £5 15s. to £6 7s. 6d.

Profits, Dividends and Finance.

A notable event this week has been the issue of the prospectus of the new combine, Swan, Hunter, Wigham, Richardson, Limited, with a share capital of £1,500,000, plus £500,000 4¼ per cent. first mortgage debenture stock.

A circular was yesterday issued by Measures Brothers, Limited, calling an extraordinary general meeting of shareholders for the 26th inst., to increase the company's capital to enable the board to acquire an additional undertaking—namely, H. & G. Measures of Croydon and Wandsworth, a provisional agreement having already been entered into. The directors seek power to increase the capital of the company to £315,000, by the creation of 30,000 new ordinary shares of £1 each. The present authorized capital of the company is £285,000.

The Rhymney Iron Company, who make precious little iron to-day, and are mainly concerned with coal mining, will only pay 3½ per cent. this year, compared with 5 per cent. the previous year and 7½ per cent. for 1900-1901.

John Brown & Co., in their annual report just to hand, state that the general depression in trade referred to in last year's report has continued throughout the year, and the earning powers of many departments at the Atlas Works have been consequently affected. An order has been recently received for a large steamer for the Cunard Steamship Company, and it is anticipated that the yard will be fairly employed during the present year. The profit on last year's operations reached £198,364.

The Ebbw Vale Steel, Iron & Coal Company report a gross profit of £178,468, compared with £214,969 two years ago. Last year, however, the gross profit was only £47,348, so that the report may be regarded as gratifying. A dividend of 5 per cent. is paid, with £30,000 added to the reserve fund and £19,572 carried forward.

Spanish Ore Exports.

Alexander Finlay & Co., Limited, of Motherwell, Scotland, are engaged on the construction of a pier at the port of Almeria, Spain, for the Alquife Mines & Railway Company, Limited, a British enterprise. Iron ore is at present loaded at Almeria in rather a primitive fashion. From the rail to the dock is a distance of 1 mile, and the ore is handled several times. All that will shortly be changed. The pier is to be 1800 feet long. The first 240 feet is carried on an earthwork embankment, for the next 600 feet there is a viaduct of eight masonry arches and three steel work spans, there is next a viaduct with seven steel towers and eight spans averaging 60 feet, and the railway is finally carried to the pier proper, the length of which is 360 feet. Pockets capable of holding 4000 tons are located on each side of the pier, from which the mineral is delivered by chutes 16 feet long. There are ten chutes on each side from the new pier. Vessels may be loaded in two or three hours, against six to nine days by the present method. The company plan to export 300,000 tons yearly.

Visit of French Engineers.

A large party of French engineers, members of the Association des Ingénieurs des Ponts et Chaussées et des Mines, and all connected with either railway or public works in France, has been visiting this country to inspect various large undertakings. The party numbers 77 persons and reached here last week. They first examined the national harbor at Dover, and came on to London. The following day they visited the Surrey Docks, examined the Tower Bridge, where the various engineering details were fully explained to them; then under the guidance of the chief engineer of the London, Brighton & South Coast Railway Company they inspected the extensions which the company are carrying on at Victoria Station. In due order and on succeeding days the visitors inspected the works on the Baker Street and Waterloo and Great Northern, Piccadilly and Brompton railways, now in course of construction by the Underground Electric Railways Company of London. The party then proceeded to the provinces, and when last heard of were examining the Liverpool docks, the overhead railway and the Manchester ship canal.

The Mono-Rail Quick Transit.

It is not impossible that after all the mono-rail line between Manchester and Liverpool may become an accomplished fact. A company has now been registered for the purpose of carrying through the proposal. The engineers hope that they will have cars running on the line at a speed of 110 miles an hour. At present it takes 40 minutes to go from Manchester to Liverpool by the fastest express, but when the mono-rail is built the time, according to the mono-railists, will be reduced to 20 minutes.

S. G. H.

The Lackawanna Steel Company.

At a meeting of the Governors of the New York Stock Exchange an application was granted for listing $3,398,000 first mortgage 5 per cent. bonds of the Lackawanna Steel Company. The statement of the company as of April 30 last, the first that has been issued by the corporation in some time past, accompanied the application. The consolidated balance sheet April 30, 1903, showed:

Capital assets:		
Cost of property	$23,222,849.97	
Less surplus of constituent companies at June 1, 1902	1,381,063.39	
		$21,841,786.58
Investments in other companies		5,544,987.87
Total		$27,386,774.45
Current assets:		
Manufactured products:		
Work in progress, material and supplies on hand, sundry machinery and tools	$5,784,968.43	
Accounts receivable:		
Customers' accounts	$137,688.12	
Advance payments	247,970.63	
Loans	304,842.74	
Miscellaneous	43,915.53	
	734,417.02	
Balance due on treasury stock sold	404,800.00	
Cash at bankers':		
On current account	$130,653.15	
On special deposit (drawing interest at 4 per cent.)	3,610,743.55	
Working funds	29,000.00	
	3,770,396.70	
		10,694,582.15
Deferred charges to operation:		
The Lackawanna Iron & Steel Company		108,766.91
Grand total		$38,190,123.51
Capital liabilities:		
Capital stock authorized		$60,000,000.00
Capital stock subscribed		35,000,000.00
Full paid shares (L. St. Company)	$20,000,400.00	
Full paid shares (Lackawanna Iron & Steel Company) outstanding, to be exchanged share for share for Lackawanna Steel Company stock upon presentation	28,600.00	
Total full paid stock	$20,029,000.00	
60 per cent paid shares (Lackawanna Steel Company)	8,982,600.00	
Total amount paid in		$29,011,600.00
Lackawanna Steel Company first mortgage conv. 5 per cent. gold bonds (due 1923):		
Amount authorized	$20,000,000.00	
Subscribed	15,000,000.00	
Paid in		6,128,083.14
Lackawanna Iron & Steel Company 5 per cent. gold bonds, due 1926:		
Authorized issue	$1,800,000.00	
Less in treasury	25,000.00	
		1,775,000.00
Total		$36,914,683.14
Current liabilities:		
Accounts payable: audited vouchers	$1,079,488.73	
Outstanding accounts, bond, interest, taxes, &c.	103,914.30	
		1,183,403.03
Reserves:		
Bad and doubtful bills	$216.69	
Contingent fund	2,718.96	
		2,935.65
Profit and loss:		
Profit from June 1, 1902, to December 31, 1902	$101,247.69	
Deduct loss for four months, being balance of bond interest accrued, as per profit and loss statement.	12,146.00	
		89,101.69
Grand total		$38,190,123.51

The bonds now listed are part of an issue of $20,000,000, of which $15,000,000 have been sold. These bonds are convertible between April 1, 1906, and April 1, 1915, into an equal amount of stock. To provide for such conversion the capital stock of the company was increased from $40,000,000 to $60,000,000. Of this amount $19,971,000 was issued share for share for the stock of the old Lackawanna Iron & Steel Company; $15,000,000 has been subscribed for in cash, of which 60 per cent. has thus far been paid in; $5,000,000 is reserved for future corporate purposes and $20,000,000 for purposes of conversion.

In addition to the stock of the old Lackawanna Iron & Steel Company, which was one of the leading steel concerns of the country, the present mortgage also covers the following securities, the accompanying details in regard to which give a good idea of the great properties of the parent company:

9990 shares of Witherbee, Sherman & Co., a corporation of New York; par $100; total issue authorized and outstanding, $3,000,000; the owners of iron ore mines and deposits at Mineville, near Port Henry, which have been in operation for upward of 50 years. The mines are in active operation, and the company's present rate of dividends is 6 per cent. The company have no bonded indebtedness.

4995 shares of the Lackawanna Coal & Coke Company, a corporation of Pennsylvania: par $100; total issue authorized and outstanding, $500,000; organized in 1901. They are the owners of the fee or mineral rights of about 22,000 acres of bituminous coal lands in Indiana and Cambria counties, Pennsylvania. Upon their properties a mining plant of the capacity of 10,000 tons per day is in course of equipment and is about 50 per cent. completed. The company have no bonded indebtedness. The company have begun shipment of coal but have not yet declared dividends.

4991 shares of the South Buffalo Railway Company, a corporation of New York; par $100; total issue authorized and outstanding, $500,000; organized in 1899. They own and operate about 7 miles of railroad connecting the yard trackage of the Lackawanna Steel Company's plant directly or indirectly with practically all of the lines of railway centering in Buffalo. The company have no bonded indebtedness. They have begun to show earnings from operation, but have not yet paid dividends.

4995 shares of the Tilly Foster Iron Mines, a corporation of New York; par $100; total issue authorized and outstanding, $500,000: organized in 1864. They own the Tilly Foster Iron Mines, Putnam County, New York, and about 130 acres of real estate. The mines have not been operated since 1896, and no dividends have been declared since that time. They have no bonded indebtedness.

2965 shares of the Franklin Iron Company, a corporation of New Jersey; par $100; total issue authorized and outstanding, $300,000; organized in 1872. They own the Franklin iron mines, furnace, quarries and appurtenant property, about 9000 acres in all, at Franklin Furnace, N. J. The properties have not been operated since the year 1898, and no dividends have been declared since that time.

5498 shares of the Odanah Iron Company, a corporation of Wisconsin; par $25; total issue outstanding, $500,000; incorporated in 1886. They own long term mining leaseholds in the Gogebic Range, Wisconsin. The company are actively engaged in iron ore mining and paid a dividend in 1902 of 16 per cent. They have no bonded indebtedness.

5998 shares of the Verona Mining Company, a corporation of Michigan; par $25; authorized issue, $300,000; outstanding, $300,000; incorporated in 1900. They own long term leaseholds of iron ore properties in the Menominee and Gogebic ranges, Michigan, under which the company are now operating. The company have no bonded indebtedness and have not yet paid dividends.

3645 shares of the Scranton Mining Company, a corporation of Minnesota; par $100; total issue authorized and outstanding, $365,000; incorporated in 1902. They own long term leasehold interests in iron ore properties in the Mesaba Range, Minnesota. The company have no bonded indebtedness, and have not paid dividends.

1998 shares of the Hobart Iron Company, a corporation of Minnesota; par $100; total issue authorized and outstanding, $300,000; organized in 1900. They own among other properties long term leasehold interests in the Mesaba Range, Minnesota, under which the company are operating. They have no bonded indebtedness, and have not paid dividends.

611 shares of the Corsica Iron Company, a corporation of Minnesota; par $100; total authorized, $100,000; outstanding, $92,000; organized in 1898. They own long term leasehold interests in the Mesaba Range, Minnesota. They have no bonded indebtedness, and have not yet paid dividends.

148 shares of the Ontario Mining Company, a corporation of West Virginia; par $100; total issue outstanding, $25,000; incorporated in 1891. They own Canadian exploration rights. They have no bonded indebtedness.

The shares of ore and mining companies above mentioned, owned by the Lackawanna Steel Company and the Lackawanna Iron & Steel Company, together with certain ore contracts owned by the former company, represent the ownership or effective control of upward of 56,000,000 tons of iron ore.

Five shares of the Black Lick Water Company, five shares of the Buffington Water Company, five shares of the East Wheatfield Water Company, five shares of the Jackson Water Company. These are corporations of Pennsylvania, organized in 1901, each with a total outstanding capital stock of $1000, and doing business in the vicinity of the Lackawanna Coal & Coke Company's coal lands in Indiana and Cambria counties, Pennsylvania. They have not paid dividends. None of them have any mortgage indebtedness.

None of the corporations above mentioned have ever defaulted with reference to any mortgage obligation.

The Lackawanna Steel Company own about one-sixth and control an additional one-sixth of the Cornwall Ore Bank Company, a tenancy in common owning the Cornwall mine hills and ore banks at Cornwall, Pa. They also own the two Colebrook furnaces at Lebanon, Pa., with 620 acres of land. The Lackawanna Iron & Steel Company are the holders of a 20-year lease expiring December 1, 1922, from the Cornwall Iron Company, covering the North Cornwall Furnace and the two Bird Coleman furnaces at Cornwall, Pa., with appurtenant land, improvements and equipment. All of the furnace properties mentioned have been improved and modernized since their acquirement by the company. The Lackawanna Iron & Steel Company also own one-sixth of the capital stock of the Cornwall Iron Company (Pa.), and about one-third of the capital stock of the Cornwall & Lebanon Railroad Company (Pa.), and operate the Cornwall Railroad. Since entering upon the building of the Buffalo plant the Lackawanna Iron & Steel Company have been engaged in the construction and improvement of their properties and only to a limited extent in operation. They have received income from their interests above mentioned, and from the earnings of such limited operation during the period in question, but have not declared dividends during said period.

The Board of Directors of the company is as follows: J. G. McCullough, Henry Walters, Warren Delano, Jr., C. Ledyard Blair, J. J. Albright, James Speyer and Moses Taylor, to serve for three years until the annual meeting in March, 1906; H. A. C. Taylor, W. E. Dodge, H. McK. Twombly, Cornelius Vanderbilt, Adrian Iselin, Jr., B. S. Guinness and B. H. Buckingham, to serve for one year until the annual meeting in March, 1904; D. O. Mills, Samuel Mather, Edmund Hayes, Walter Scranton, M. Taylor Pyne, G. R. Fearing, Jr., and Robert B. Van Cortlandt, to serve for two years until the annual meeting in March, 1905.

The officers of the company are as follows: President, Walter Scranton; vice-president, Moses Taylor; secretary, John W. Farquhar; treasurer, J. P. Higginson; comptroller, Marshall Lapham; general manager, Henry Wehrum.

Notes from Germany.

Simon W. Hanauer, United States Deputy Consul General at Frankfort, Germany, sends the following interesting information:

German Mining Interests.

The general meeting of the Association of Mining Interests of Germany was held on May 23 at Essen. The chairman, after reporting on the condition of the trade during the last year, quoted figures showing that the output of coal and iron had considerably increased since the beginning of this year. The daily production of the coal mines belonging to the Rhenish-Westphalian Coal Syndicate is now 173,000 metric tons, which is not much below the average daily output during the latter half year of 1900, when the boom was still on.

The chairman addressed the meeting on the necessity of closely following American business policy and methods, especially in the manner of concentrating interests and reducing costs of production by forming trusts. He regretted that a prejudice against these existed in the public mind, which feared that the trusts had the tendency to lower the wages of the working people. This, however, he declared is against actual facts, as proved by the wages paid by the United States Steel Corporation and other great trusts in America. He also pointed to the advantages obtained by the American combines in economizing in management, the creation of standard types of products, and the specialization of production in having the different articles made at certain works which are best adapted for producing them in point of economy and quality. Next to their superior methods of organization and operation, the American trusts and producers have another great advantage over the German industries, which consists in cheaper transportation charges. The chairman added that the sending out of experts by the German Government to study the railroad system of the United States would improve the freight transportation service in Germany and introduce more practical methods than are now in vogue. Among these he mentioned the building of freight cars having a greater carrying capacity than 20 tons, which are now in use in Germany.

He warned his hearers that the German iron industries cannot count upon a continuation of the present shipments of iron and steel to America. On the contrary, it is to be feared that when high tide of business prosperity in the United States recedes large masses of American iron and steel products will be dumped on foreign markets. "In view of these facts it is no wonder that the United States attracts the eye of economical observation. The description of American manufacturing methods, of the development of production and of the condition of industries there has formed a new branch of literature. All experts who have written or spoken upon this subject seem to agree that the advanced position which American competition has gained is mainly due to superior operation methods in industrial production and to favorable transportation facilities."

Machinery Exports.

German exports of machinery during the first quarter of this year amounted to 52,000,000 marks in value, against 46,000,000 for the same quarter of 1902. This gain is participated in by the shipments of automobiles, bicycles, machine tools, sewing and electrical machines, steam engines and pumping and textile machinery. The exports show an increase of 1,800,000 marks in machine tools, 1,300,000 marks in steam engines, 1,200,000 marks in bicycles, 900,000 and 700,000 marks in sewing machines and automobiles, respectively, and 700,000 marks in textile machinery.

The reduced home demand forces German manufacturers to increased efforts for making sales in foreign markets, although the prices obtained are, on the whole, unsatisfactory, in many cases hardly covering production cost. Still this crisis in Germany's industrial and business life has the beneficent effect of expanding her foreign trade and the winning of new markets.

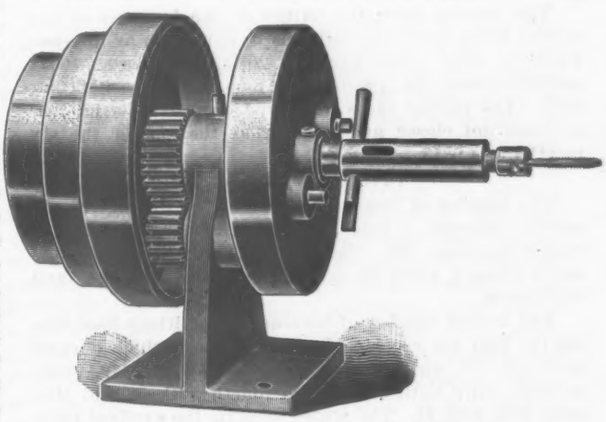
Pig Iron and Coal Production.

Germany's production of pig iron during the four months ending April, 1903, aggregated 3,184,419 metric tons, against 2,608,283 tons for the same period of 1902. In the same four months of this year the output of coal from German mines and works was as follows:

	Metric tons.
Black coal (bituminous and anthracite)	37,194,289
Lignite (brown coal)	14,319,022
Coke	3,617,052
Briquettes (pressed coal blocks)	3,202,120

The Atlas Tapping Machine.

The spindle of the tapping machine here illustrated is arranged so as to stop after the reversing of the tap,



THE ATLAS TAPPING MACHINE.

leaving the spindle stationary while the machine is running full speed. The step cone pulley acts both as tight and loose pulley and no backing or feeding belt is required. The machine taps from 4-36 up to ½ inch at the rate of 6000 per day. The manufacturers are now building a gauge attachment for bottom tapping and also a rest for holding small work. The machine is built by the Atlas Machine & Tool Works, for whom Haydn, Roth, Evans Company, Cincinnati, are sole agents. The tool weighs 18 pounds.

National Bankruptcy Report.

WASHINGTON, D. C., June 30, 1903.—The general prosperity of the country is clearly reflected in the semiannual returns showing the operations under the Federal Bankruptcy law for the six months ending March 31, 1903, which have just been compiled by E. C. Brandenburg, in charge of bankruptcy matters in the Department of Justice, through whose courtesy the correspondent of *The Iron Age* is enabled to present the advance synopsis given below:

Voluntary Cases.

The number of voluntary petitions filed during the six months referred to was 7952, an important decrease as compared with the corresponding period a year ago, when the total was 9052, showing that the number of persons taking advantage of the voluntary features of the law is being steadily reduced as old State bankrupts secure their discharges and enter again upon active business enterprises. The number of cases adjudicated during the six months referred to was 7929, the petitions dismissed numbered 153, the discharges granted were 5733 and those refused were 67. The number of compositions confirmed during the six months was 85, while the number refused was 4. In all particulars these statistics represent not only improved conditions in the commercial world, but increased expedition on the part of the courts in disposing of voluntary petitions.

The largest number of voluntary petitions filed during the year are reported from Alabama, a total of 1045 being charged to that State. New York stood second with 882, Ohio third with 312 and Pennsylvania fourth with 281. Other States were in order, as follows: Georgia, 255; Iowa, 248; Tennessee, 230; Texas, 193; California, 175; Kentucky, 174; Wisconsin, 125; Missouri, 110. The States in which the smallest number of involuntary petitions were filed during the six months referred to were as follows: Nevada, 1; Arizona, 1; Porto Rico, 2; New Mexico, 2; Hawaii, 3; Wyoming, 5; Delaware, 5; District of Columbia, 20.

Referees' reports showing voluntary cases closed during the six months ending March 31 last present an unusually interesting exhibit. The total number of cases was 6182, with aggregate realized assets of $3,867,058 and liabilities of $63,947,030, which shows a very substantial gain in the ratio of assets to liabilities as compared with previous years. Of the cases closed 3518 developed assets while 2664 showed no assets. In 2446 cases the assets were less than $500. In 934 cases the liabilities were less than $1000, and in 472 cases they exceed $20,000 each. The dividends paid amounted to $1,355,160, and the exemptions were $1,447,887, the priority or secured claims aggregating $702,358, while the fees, commissions and expenses amounted to $504,794.

The returns show the nature of the business of the parties filing voluntary petitions to have been as follows: Farmers, 508; wage earners, 2033; merchants, 1652; manufacturers, 193; professional men, 319; miscellaneous, 1477. The pauper cases numbered 419, and the number of cases not closed and pending at the end of the six months was 9313.

Involuntary Cases.

The number of involuntary cases filed during the six months referred to was 1265; adjudicated, 851, and petitions dismissed, 208. There were 270 discharges granted and 9 refused, while 53 compositions were confirmed and 49 refused.

The largest number of involuntary petitions filed during the year are reported from New York, which is credited with 214, while Illinois stood second with 112, Pennsylvania third with 55, Georgia fourth with 53 and Missouri fifth with 41. The States showing the smallest number of involuntary petitions were Nevada, 1; Delaware, 1; North Dakota, 2; Porto Rico, 2; Arizona, 4; Idaho, 5; New Hampshire, 7; Kansas 9; Hawaii, 9.

The reports of the involuntary cases closed during the six months show a decided falling off, the aggregate being 530, as against 1150 during the corresponding period a year ago. The assets in these cases amounted to $2,217,206, while the liabilities were $10,267,748. The assets thus amounted to about 22 per cent. of the liabilities, which is above the average record since the Federal law took effect. There were 439 cases with assets and 91 without. In 34 cases the assets were less than $500. In 171 cases the liabilities were less than $1000, and in 94 cases they exceeded $20,000. The dividends paid amounted to $1,105,485, the exemptions were $95,234, the priority or secured claims amounted to $628,794 and the fees, commissions and expenses aggregated $245,214.

The statistics showing the nature of the business of parties against whom involuntary petitions were filed are as follows: Farmers, 9; wage earners, 28; merchants, 315; manufacturers, 43; professional men, 6; miscellaneous, 129. No petitions were filed against paupers, and at the end of the year 2710 cases not closed were still pending.

Statistics of New York and Illinois.

The detailed statistics with regard to the State of New York are especially interesting. Of the 882 voluntary petitions filed 870 were adjudicated, discharges were granted in 764 and refused in one case. The assets amounted to $416,204, and the liabilities to $18,276,530, while the dividends paid aggregated $360,013. There were 214 involuntary petitions filed in the State, of which 127 were adjudicated. Discharges were granted in 49 cases and refused in one. The assets amounted to $526,862, while the liabilities were $1,825,647 and the dividends $433,679.

The total number of voluntary petitions filed in Illinois was 790 and the adjudications numbered 799, including several which came over from the preceding six months. Discharges were granted in 661 cases and refused in two cases. The total assets amounted to $189,129, the liabilities to $8,246,063 and the dividends to $66,868. Involuntary petitions were filed against 112 persons in Illinois and 80 cases were adjudicated. Discharges were granted in 11 cases and refused in one case. The total assets realized amounted to $215,378. The liabilities were $2,530,023 and the dividends $212,699.

Summarizing the returns as compared with the corresponding period a year ago it is found that the number of cases, both voluntary and involuntary, has decreased, while the proportion of assets and dividends to liabilities has materially increased. The expenses of administration show a slight proportionate decrease. Mr. Brandenburg regards these developments as indicating that the longer the law remains on the statute books the greater will be the benefits derived by the business community, and he looks for a still more satisfactory showing during the current six months in view of the amendment of the Federal statute by the act of February 5, 1903, which is now in force.

W. L. C.

Need of Improvements in Hayti.

PORT-AU-PRINCE, June 25, 1903.—Hayti and the adjacent republics of Santo Domingo have scarcely been waked up to American commerce and American enterprise as yet. Everything is to be done here. Railroads need to be pushed through. The line from Port-au-Prince to Santo Domingo has only 60 miles built and already needs new rails and complete outfitting, as to cars, locomotives, stations, &c. Once this line is completed, east and west, with the northern branch, it will not only pierce the richest region of the two republics, but will also reach the iron and copper mines, which have lately begun to develop.

Cape Haytien and Port-au-Prince are both sadly in need of new iron piers. I believe the Government would be glad to contract with responsible parties, or give them concessions for such wharves. The many fires in the different cities of the two countries have set the people to thinking, and numerous iron residences and business blocks are now in course of erection. The revolution burnt down the best quarter of San Domingo city lately, and that, I understand, will also be built of iron and steel. Strange to say, but few American contractors have put in bids for any work hereabouts. They are mostly German or French, occasionally Belgian. It is true that recently these countries have been burdened with claims of American citizens, some amounting to $4,000,000 where only thousands had been invested; this causes resentment on the part of these people. I can assure you that nothing has been done by American enterprise in either country up to the present.

C.

Statistics of Corporations to Be Gathered.

WASHINGTON, D. C., June 30, 1903.—Early in the new fiscal year, which begins to-morrow, the Department of Commerce and Labor will call upon the leading corporations in the principal industries of the country for certain information with regard to their operations, to be supplied in the form of answers to specific inquiries prepared in schedule form. The Department's purpose will be to supplement a large amount of data gathered within the past two or three months by the Bureau of Corporations, including published financial reports, census monographs, &c. The information heretofore gathered is now being carefully classified and compiled in convenient form so that it may be used as the basis of the schedules for additional data to be sent out later on.

The authority under which the Secretary of the Department and the Commissioner of Corporations will act is found in Section 6 of the law creating the new Department, which provides that the Commissioner "shall have power and authority to make, under the direction and control of the Secretary of Commerce and Labor, diligent investigation into the organization, conduct and management of the business of any corporation, joint stock company or corporate combination engaged in commerce among the several States and with foreign nations, excepting common carriers, subject to 'an act to regulate commerce,' approved February 4, 1887, and to gather such information and data as will enable the President of the United States to make recommendations to Congress for legislation for the regulation of such commerce, and to report such data to the President from time to time as he shall require; and the information so obtained, or as much thereof as the President may direct, shall be made public."

It is further provided by the organic act creating the Department that the Commissioner of Corporations shall exercise the same power with respect to corporations, &c., as is conferred by law on the Interstate Commerce Commission with respect to common carriers, including the right to subpoena and compel the attendance and testimony of witnesses, and the production of documentary evidence and to administer oaths. In addition, it is made the duty of the Buerau of Corporations "to gather compile, publish and supply useful information concerning corporations doing business within the limits of the United States as shall engage in interstate commerce or in commerce between the United States and any foreign country, including corporations engaged in insurance."

A Conservative Programme.

While the Commissioner of Corporations is thus clothed with unlimited authority to investigate the organization, conduct and management of any corporations doing an interstate business, the correspondent of *The Iron Age* is in position to state that neither Secretary Cortelyou nor Commissioner Garfield has in contemplation any movement of a sensational character, or which would be likely to arouse the hostility of the great corporate interests of the country. In seeking to supplement the data heretofore gathered with regard to corporations in general, and the great industrial combinations in particular, it is not proposed to send out inquisitorial schedules in order to secure information with a view to making it the basis of attacks upon those supplying it. While the Bureau of Corporations is authorized by the law to make investigations based on complaints and controversies, the original work which is contemplated in connection with the inquiries soon to be made has no bearing upon any such complaints or controversy, but is designed simply to complete the records of the Bureau heretofore compiled from other sources.

The officials of the Department appreciate the fact that, even in the collection of routine information on the basis of special schedules, it would be a matter of much expense and annoyance if inquiries were sent at frequent intervals, or if several subordinate officials of the Department were authorized to prepare and send out such inquiries. It has therefore been decided that the Bureau of Corporations will compile all inquiries, which will then be forwarded through the office of the Secretary. It is proposed to be entirely frank with all parties from whom information is solicited, and there will be no mystery with regard to the purpose for which the facts or figures are desired.

The reports which have reached Secretary Cortelyou from the officials of the Census Bureau, showing the prompt and courteous manner in which the leading industrial combinations complied with the requests embodied in the census schedules, have been very gratifying, and the Secretary does not doubt that the relations of the new Department with all of the representatives of the great industries of the country will be mutually satisfactory. The Department is now receiving without solicitation the financial reports of insurance companies throughout the country, and these are being placed on file for future reference. The only industrial corporation from whom a report has been received are the United States Steel Corporation, who have forwarded a copy of the elaborate annual report rendered to the stockholders early in the current year.

Appointments Yet to Be Made.

Two very important posts in the new Department yet remain to be filled—namely, those of the Assistant Secretary of Commerce and Labor and the Chief of the Bureau of Manufactures. For a variety of reasons it is probable that these places will not be filled until after the Statistical Commission now engaged in an investigation of the bureaus taken over by the new Department to eliminate duplication of work files its final report. The commission has been at work for several weeks and has already made a number of important recommendations which will result in a great saving in the cost of preparing and publishing statistical reports.

Some concern has been expressed by manufacturing interests lest one of the two important places referred to should be filled by the appointment of a radical representative of organized labor. The President and Secretary Cortelyou, while friendly to labor organizations in general, do not think these places should be filled by extremists of any kind. The report widely circulated that E. E. Clark of the Order of Railway Conductors will be appointed Assistant Secretary is erroneous. It is possible that Mr. Clark may be chosen to succeed Col. Carroll D. Wright, when, as heretofore announced, the latter resigns his place as Commissioner of Labor to become president of a New England college. It is stated on good authority, however, that Colonel Wright will probably not leave the Department until his current term expires in February, 1904. W. L. C.

The Hydraulic Test of Marine Boilers.

BY EGBERT P. WATSON.

It is to be hoped that the commission charged with the revision of the Rules and Regulations of the Steamboat Inspection Service, now in session at Washington, will not conclude their labors without giving some attention to the hydraulic test which marine boilers are now subjected to. This test is double the working pressure, and that it is a tax upon the boiler instead of an assurance as regards its ability to stand the working pressure most unprejudiced persons will admit. Instances are not wanting where boilers which have been malconstructed to a dangerous degree have withstood the hydraulic test and afterward given out at little more than half the hydraulic test pressure; the weak points being out of sight remained a constant menace to life under steam pressure. It may be said without fear of successful controversion that the hydraulic test reveals nothing whatever as regards the permanent stability of the boiler it is applied to. A steam boiler is a vessel under all sorts of strains before it is tested; these are structural strains, for want of a better term, caused by unequal tensions of braces and seams, for no two sections or courses can possibly be riveted together under the same stress. Before the rivets are closed the seams are bolted together, iron and iron; but no matter how much care may have been taken in fitting the courses together, they do not fit like a cover on a bandbox, and the last rivets driven have a crucial tension on them, caused by having to hold against more or less buckle or gather in that particular

seam. Now this is repeated on every seam, straight or circumferential, with the result before mentioned. The same difficulty is encountered with braces; they are fitted to their places with more or less care—less, usually, than otherwise—and either riveted or held by nuts upon both sides of the heads. It is not within the bounds of possibility to set up the same tension upon all the braces in a boiler, the only approximation to unity being obtained by tuning them to the same note when struck by a hammer. Most boiler makers being more or less hard of hearing—not to say stone deaf—it is easy to see that the method is not wholly reliable. Under the conditions just specified a steam boiler would, if made of flexible material, look something like a cocked hat, with the various tensions existing in it, yet the hydraulic test is expected to harmonize all these strains, and if the boiler passes through them without failure it is supposed to be all right. It must be borne in mind, also, that this hydraulic test is a cold one, the temperature of the water being whatever the season may be, sometimes in winter being barely above the freezing point. This greatly aggravates the situation, for all parts not being exposed alike the contractions are uneven. I have known brace after brace in a steam chimney to give way under such conditions before half the test was applied. A simple remedy for many of these troubles would be to permit a preliminary warming of the water in a boiler before testing it to, say, 150 degrees; there would then be an approach to the conditions which obtain when the boiler is in action. The adverse strains would be mollified, at the least, and a slight give and take would occur which would go far to relieve the boiler of conflicting tensions. This preliminary heating is not now allowed, but inasmuch as it would not vitiate the integrity of the proof in any degree I think it should be permitted, and the attention of the supervising inspectors is hereby respectfully called to it.

The American Car & Foundry Company's Year.

The annual report of the American Car & Foundry Company for the year ended April 30 has been made public. It shows a surplus of $4,059,902, as compared with $1,595,602 in 1902. The figures follow:

	1903.	1902.	Increase.
Gross earnings	$8,447,030	$5,503,928	$2,943,102
Renewals and repairs	1,044,399	817,275	227,124
Balance	$7,402,631	$4,686,653	$2,715,978
New construction	342,729	391,051	*48,322
Applicable to dividends	$7,059,902	$4,295,602	$2,764,300
Dividends, preferred (7%)	$2,100,000	$2,100,000	.....
Dividends, common (3%)	900,000	†600,000	300,000
Total dividends	$3,000,000	$2,700,000	$30,000
Surplus	$4,059,902	$1,595,602	$2,464,300
Previous surplus	6,670,551	5,074,949	1,595,602
Total surplus	$10,730,453	$6,670,551	$4,059,902

The general balance sheet as of April 30 shows:

	1903.	1902.	Increase.
Assets.			
Cost of plant and properties	$54,366,995	$55,127,133	*$760,138
Cost of steel plants	2,693,770	905,000	1,788,770
Securities of other companies	1,813,863	3,086,050	*1,272,187
Materials on hand	13,133,803	11,915,129	1,218,674
Accounts receivable	9,613,587	7,461,950	2,151,637
Cash	2,463,057	1,571,458	891,599
Totals	$84,085,075	$80,066,720	$4,018,355
Liabilities.			
Preferred stock	$30,000,000	$30,000,000	.....
Common stock	30,000,000	30,000,000	.....
Audited vouchers	12,930,406	12,925,793	$4,613
Pay rolls	424,216	470,376	*46,160
Surplus account	10,730,453	6,670,551	4,059,902
Totals	$84,085,075	$80,066,720	$4,018,355

* Decrease. † Two per cent.

The company manufactured 76,392 cars during the fiscal year, as compared with 64,140 in the previous year, the increase amounting to over 19 per cent. The following figures show the output of cars and products of a miscellaneous character, comparison being made with the previous year:

	1903.	1902.
Total cars	76,392	64,140
Car wheels	900,000	800,000
Bar iron, tons	92,000	83,000
Iron castings, tons	75,000	62,000
Iron pipe, tons	18,000	23,000
Axles, tons	22,000	18,000
Lumber, feet	12,000,000	13,000,000

At the annual meeting last week President Eaton, who presided, supplemented the statement of earnings and the balance sheet with some interesting verbal remarks about the company's business the past year. Besides an increase in the output of cars of 19 per cent. during the year the sales of miscellaneous products increased $2,000,000 over the year 1902. The increase in receipts from miscellaneous business in 1902 over 1901 amounted to only $1,000,000.

At the present time nearly 15 per cent. of the company's business is made up of miscellaneous orders. Orders now on the books aggregate 34,000 cars, which is the largest number ever booked at this time of year, except last year, when the bookings aggregated about 37,000 cars. So far this fiscal year (May and June) the number of cars built has been 12,000, and so far this month orders for 5000 cars have been received. Practically all of the plants are in operation, although one or two plants are not running to their full capacity, but will as soon as certain materials are received. President Eaton, in speaking of the materials on hand, said that if all the cars now on the order book were completed, even if no more orders were taken, the company would have on hand cash amounting to $15,000,000, and this was given as an extremely conservative estimate.

As regards the steel car output, most of this class of cars manufactured the past year were built at the Detroit plant. The Berwick steel car plant, which is a duplication of the Detroit plant, has only been in operation about two months, and the steel car capacity this year ought to be upward of 22,000.

Appropriate resolutions were passed approving the acts of officers and directors of the company during the past year. The directors met at the New York office subsequently and re-elected officials and declared the regular quarterly dividend of 1¾ per cent. on the preferred stock and 1 per cent. on the common stock, both payable August 1.

Pacific Coast News.

SAN FRANCISCO, CAL., June 22, 1903.—We are at last in the midst of the harvest, and our farmers are beginning to find out where they are financially. In the southern part of the State and in the coast counties the crops of wheat, barley and other cereals have been good, and fair in the San Joaquin Valley and in the Sacramento Valley. Altogether the wheat harvest will be about two-thirds of what a good one should be, but the better prices will, as was the case last year, do much to make up for the lessened yield. Some varieties of fruit, such as apricots, have fallen short in the yield, but, on the whole, the increased number of trees coming into bearing makes up for that and the revenue derived by orchardists and vineyardists will be as good as that had last year—that is, somewhere about $40,000,000. There have been good crops of vegetables all over the State.

On the whole, the outlook is good for trade in general, and for hardware and metals particularly. There has been a wonderful development in the coast counties this year, the lumber sections particularly. Supplies of all descriptions, machinery of every kind, notably saw mill machinery, will be wanted, as almost every one in the redwood and sugar pine sections is improving or adding to his or their plants, while the small towns in these sections are growing apace and need building hardware. Eureka, for instance, has become a fine modern city, and is growing rapidly. The cities of the South, too, are growing at a great rate, and the building boom in San Francisco has not abated in the least. Then new industries, such as the steel and wire and other plants being put up on the Bay of San Francisco and the plants of the new power companies, are all using up a great deal of material that will have to be supplied as far as may be from the East, otherwise from England and Belgium.

There has been somewhat of a lull in the arrival from English and Belgian ports of supplies for our foundries and machine shops and for our tall buildings, but the advance guard of the Belgian fleet came to hand a couple of days ago and now there is a long string of them which will be soon due. Within the past two days the "L'Hermite" has come to hand from Glasgow with 1575 tons of pig iron, while the "Stronsa" from Hull had 1175 tons.

The inability of Eastern manufacturers to supply the demands of the foundries was one reason why we had to import from abroad. Eastern pig iron has been held in this market at $27 per ton, whereas English is and has been held at $22 to $23, so that there is a clear gain of $4 to $5 per ton in the foreign article. As we are promised a plant on the bay for the making of pig iron and steel we shall probably in a year or two be able to supply our own needs in this respect, as it is right and fitting that we ought. No doubt there have been many false alarms in regard to the establishment of plants on the bay shore during the past few years, but as we have spread out in other directions meanwhile, and in this very iron and steel industry quite notably, it is more than probable that we shall at least supply our own wants in this respect.

The lockout at the plant of the American Steel & Wire Company still continues. Outside of this matters are going along very well in the manufacturing section. The Eastern troubles of the great shipbuilding concern do not seem to worry our people here, and the Union Iron Works go along with their work as if no such thing as a shipbuilding combine had ever been thought of. The works are leased from the combine by some of the old stockholders, and as we have the plant and the work to do and the skill to do it the rest is easy.

The exports of iron and steel and their manufactures continue to be of fair volume, although they have fallen off somewhat lately. This has been especially notable in machinery. The Eastern transit trade in machinery with the Orient by way of San Francisco has been light, but the exports of bicycles remain heavy. J. O. L.

Scientific and Technical Notes.

Liquid air is delivered in Berlin, 2 liters (0.528 gallon) at a time, for about 35 cents. In a recent issue of *Energie* of that city it is stated that the receptacles are made of glass, with double walls, the space between the walls being filled with an insulating material, the walls being silvered to prevent the radiation of heat and the whole enveloped in an insulating material. They retain their temperature for 14 days. Several drops of the liquid in a glass of water produce freezing, and it is intended for such uses as refreshing drinks and improving the condition of the air in sick rooms.

The German Navy authorities have decided to experiment with engines of the steam turbine type. Orders have been issued to equip one torpedo boat with turbine engines capable of developing 5000 horse-power; and a small cruiser, which is to replace the cruiser "Mercury," is to be similarly fitted with engines of 10,000 horse-power. It is the intention to subject the machinery of these vessels to exhaustive tests, after the usual German fashion of thoroughness, and to institute comparisons between this method of propulsion and that more commonly adopted, as represented by the regular reciprocating steam engines.

The last Congress appropriated the necessary funds with which to build five new battle ships. In these electric motors and other devices will be used to an unprecedented extent. Most of the ammunition hoists will be controlled by electricity, while a moving platform passing by the doors of the ammunition rooms will carry a continuous supply to the lifts, the men in the magazines having merely to carry the boxes to the door and place them on the traveling "sidewalk," from which they will be removed as fast as needed at the various hoists, which are to be directly underneath the gun stations served. A safety feature of the ships will be the method by which all of the doors in the principal watertight bulkheads can be controlled from a central emergency station. They will be closed automatically by the simple pressing of a button.

The State of New York covers approximately 49,000 square miles, and this area is made accessible to its people for transportation purposes by 522 miles of canals, 1718 miles of street and electric interurban railways, 8114 miles of steam railways and 73,857 miles of dirt roads. The relative costs of transportation at the present time have been stated to be as follows: 20 cents per ton mile, when horse-power is used; 4 cents by electric power; one-fourth of 1 cent by the steam railways; 1 mill by steamship or canal. In order to reduce the cost of transportation by highways, it is proposed to spend $5,000,000 per year on these roads, for a period of ten years.

During 1902 the average daily production of electrolytic copper in the world was about 883 short tons, of which 764 tons, or 86.5 per cent., was supplied by the United States. Of the remaining 119 tons of daily production, representing approximately 13.5 per cent. of the total, about 8.8 per cent. was furnished by Great Britain, 2.75 per cent. by Germany and 1.6 per cent. by France. The United States now produces annually the immense amount of 278,860 tons of electrolytic copper. The by-product recovered daily contains about 740,000 ounces of silver and 950 ounces of gold, which equals an annual output of over 27,000,000 ounces of the white metal, valued at nearly $13,000,000, and more than 250,000 ounces of the yellow metal, valued at upward of $5,000,000.

A straight line engine, in use at the works of the Solvay Process Company, in Syracuse, N. Y., recently completed a continuous run of 22 months, during which period it had not once been stopped. Its speed was 250 revolutions per minute, which makes 15,000 per hour, 360,000 per day, nearly 11,000,000 per month, and a grand total for the 22 months of some 241,000,000 revolutions, without a stop. This speaks volumes for the perfection of the design and workmanship expended upon the engine, and for the excellence of the attendance received.

Reports from the Escanaba & Lake Superior Railroad record the hauling, by one locomotive, of a train of 84 loaded cars, weighing in the aggregate 4787.5 tons, a distance of 63 miles, at the rate of 13 miles an hour. This is stated to be the heaviest train ever hauled by one locomotive.

Transverse breaking tests of plate glass furnished by several different makers were recently made at the Watertown Arsenal. The thickness of the glass varied from ⅛ to 1 inch, and the span from 8 to 24 inches. The modulus of rupture, which ranged from 2000 to 8000 pounds per square inch, was generally greater with the lesser thicknesses. Of the various kinds of glass tested—rough, ribbed, polished and wired—there was little difference in strength; except that the wired glass showed a little greater strength than the other kinds; the strength was also greater for the "sandwiched rolled" than for the solid rolled wire glass. The strength of glass set in frames was practically double that of the specimens tested transversely.

President Humphreys of Stevens Institute, recently wrote that "The engineer must be more of a man of business than he has in the past. It is not enough that the technically trained engineer should be practical in the shop and in the field; he must be practical in his ability to meet business men on their own ground. Some engineers fail to secure success because they carry too large a proportion of science; some because they have not enough, and others because they fail to recognize that commercial efficiency must outweigh theoretical efficiency. The training for the engineer must be a harmonious blend of science, practice and commercial judgment."

The Iron Age

New York, Thursday, July 2, 1903.

DAVID WILLIAMS COMPANY, - - - - - - - - PUBLISHERS.
CHARLES KIRCHHOFF, - - - - - - - - - EDITOR.
GEO. W. COPE, - - - - - - - - - - ASSOCIATE EDITOR.
RICHARD R. WILLIAMS, - - - - - - - - - HARDWARE EDITOR.
JOHN S. KING, - - - - - - - - - - BUSINESS MANAGER.

The Crop Outlook.

The enormous volume of business and the recent sharp advances in prices of wheat have attracted the general attention of the business community. The nervousness and excitement which have taken possession of speculators in grain would lead one to believe that crop damage had been sustained to such an extent as to possibly seriously impair the purchasing capacity of the country. But a look under the surface shows that there are no alarming symptoms, and that while the promise on June 1 will not hold on July 1, the crops of grain raised will be above the average, even if they do not contribute to our record breaking history.

The prices made on new crop winter wheat during the past week were fully 10 cents per bushed above the level of a year ago, and such an altitude can only be maintained by a short crop. For the time being powerful interests operating on light stocks and light primary receipts of wheat have been able to control the market and put prices at an artificial level, not warranted by crop conditions alone, and the speculators have been favored by weather conditions. Speculative interests, however, are proverbially as fickle as the wind and as capricious as the weather, and a change in the weather map would quickly scatter the card houses of the bulls. These market developments are only of passing interest to those who have no direct connection with the grain trade, and the essential feature to the business community at large is the actual condition of crops and what basis the harvests will make for general business enterprises.

The winter wheat crop has been making favorable progress recently, harvesting being now general in the central portions of the winter wheat belt. The yields, however, are disappointing, threshing returns often showing, say, 6 bushels per acre, where two or three times as much was expected. Reports from central portions of Missouri, Iowa and Illinois are especially discouraging, but commercial authorities report a much better yield in the South and Southwest than a year ago, and the general impression seems to be that the minimum yield will at least equal last year's crop. Most recently the condition of spring wheat has been given greatest attention, crop damage being claimed throughout the Northwest from lack of rain. But while rains have been needed in the Dakotas and Northern Minnesota, and the crop is affected by rust in Nebraska, the grain is doing well in Minnesota, Wisconsin and Iowa, and the fact remains that the prospect is for a more than average yield of spring wheat. Conditions on the Pacific slope have been reported generally favorable, but on the coast sections of Oregon work is reported delayed by rain, while moisture is reported needed in the eastern portions of both Washington and Oregon.

On June 1 indications were for a wheat crop of from 90,000,000 to 100,000,000 bushels greater than in 1902. While this margin has been cut down quite considerably, some of it still exists. Estimates for the total wheat crop now range from 650,000,000 to 725,000,000 bushels. The latter estimate includes 200,000,000 bushels of spring wheat for the three Northwestern States, which probably will be modified within a few days.

Crop conditions abroad, of course, should not be overlooked, as they have an important bearing on the market for our own products. Reports thus far received seem to indicate a wheat yield in the importing countries of Western Europe, including the United Kingdom, that will be somewhat smaller than in 1902. Stocks afloat and in the ports of the chief importing countries are rather less than a year ago, and new wheat in Western Europe will not be available until September 1. Hence it is estimated that the requirements of Western Europe during the next two months will be equal to, if not larger than, during the corresponding months a year ago. The United States cannot, however, expect to get the lion's share of this business, as we have been losing place in the export markets for the last six months, having furnished not much more than one-third of the world's exports, while in preceding years we have supplied about one-half of such requirements. Recently exports from Russia, the Danube and Argentina have exceeded the United States exports each week, while exports from India have averaged over 1,000,000 bushels weekly. It should be noted that while the crops in Western Europe promise less than a year ago, the general European yield will probably not be below the average of the past four years.

Naturally, corn has played but a minor part in the markets of the world recently, because of the backward condition of the crop, and whatever advances have been made in prices have been merely a reflection of or in sympathy with the movement in wheat. The July report of the Government will give an estimate of the corn acreage, and this showing is awaited with interest. Commercial authorities believe that the condition of the crop improved in June, and official returns from Iowa report 7,000,000 acres of the present area in that State in excellent condition, with 1,500,000 acres, late planted, doing well.

A short crop of oats is said to be indicated in the East and an average yield is promised in the West.

The dry weather in the Northwest has affected the condition of the flax crop and influenced prices for the seed in all the principal markets, sharp advances taking place simultaneously with the rise in wheat. The acreage planted to flax will be given in the Government July report.

The condition of the cotton crop is of more than usual interest, as presenting a situation favorable to a continuance of the unbridled speculation which has been such a prominent feature of the market for raw cotton for several months. It should be remembered that the Government statistician estimated the total area planted to cotton in the United States this season as 28,907,000 acres, or an increase of 3.7 per cent. on the acreage planted last year, and that the average condition of the growing crop on May 26 was 74.1 per cent., the estimate being for the cotton belt as a whole and for the States of Georgia, Alabama and Texas in particular, being the lowest condition ever reported at this time of the year. The crop at the time of the estimate, and now, too, is almost everywhere from 10 to 21 days late. Reliable commercial statisticians, however, have noted a general improvement in crop conditions during the month of June.

It is notable that speculative forces have pushed prices to the highest level of the season, which are also the highest since 1882. As a rule the higher prices are, of course, felt most on the old crop months. For the

first time in many years there is little relation between the price of raw cotton and the manufactured goods, notwithstanding the advances in certain lines of dry goods recently. Already 500,000 spindles are said to have stopped at Fall River because of the high prices of cotton. Numerous mills in England have suspended operations, and if the present prices of spot cotton are maintained additional mills, in this country and abroad, will shut down until consumption is heavily diminished. A large stock of cotton may then be carried over into next season.

Management in Industrial Mergers.

During the past two years the students of industrial mergers have learned a great deal about them which might have been safely predicted if due allowance had been made for the fact that when a large number of individuals come together in any relation which stimulates self interest in the highest conceivable degree we are likely to witness the display of a great deal of what the moralists call "human nature." Unless this can be eliminated an additional x is introduced into the equation of commercial success, which presents unusual difficulties and gives to a good guess as much value as resides in the results of careful calculation.

The men who establish successful industries, or who successfully conduct industries already established, are, as the rule, men of more than average individuality and business capacity. Competition has developed in them a combative instinct, and undivided responsibility has made them impatient of discussion over questions of policy in business management. As the rule they know what they want to do, and how to do it in the way to give what they deem most satisfactory results. Such men are at the head of the independent concerns of sufficient consequence to make their acquisition desirable by those who plan and organize industrial mergers.

When two or more such men come into business competition the result is likely to be increasing difficulty for each in getting and holding the trade which he thinks belongs to him. When the number of such men in sharp competition greatly increases and every advantage gained by one over the others has to be schemed for and fought for, the struggle is likely to develop in those who succeed a very high order of business intelligence and executive capacity. But whatever its results, they do not seem to the man who loses sleep planning how to keep a little ahead of his competitors adequately or satisfactorily compensatory. Most of the time it seems like climbing the incline of a treadmill—all that goes to make up a strenuous life being needed to keep up with the speed of the receding platform. It is a school of instruction in which strong men are made stronger and the instinct of command is developed.

To men thus overstrained by the absorption of every mental and physical energy in the conduct of a business which never reaches the stage of development in which it will "run itself," the proposition of the merger comes as the opportunity of sleep to one exhausted in body and mind by a task beyond human power. With the argument for it we are all familiar. Plants formerly in keen competition are to be united in a common competition with those lacking the conspicuous advantages of organization. Machinery will be run on the kind of work for which it is best suited, and entire plants will be devoted to the products for which their adaptation is most conspicuous. From among the talent represented in the *personnel* of the merger will be chosen those whose qualifications and experience best fit them for executive responsibility. Great economies in salaries and selling expenses will be effected, and immense advantages will result from larger purchases and the ability to control markets by a distribution of unprecedented magnitude and variety, meeting all the needs of every consumer. The argument in unanswerable. Conceding the plausible assumptions upon which it is based, the conclusions are those from which no escape is possible. After the negotiation is finished, the plan is agreed to and arrangements are made to "finance" it.

Assuming that the financial scheme of the merger is beyond intelligent criticism, experience has shown that it is not all plain sailing even then. It does not often happen that among able men who have for years been sharp competitors it is possible to reach an agreement as to who is best fitted to command the united plants. As the rule, the choice is determined by other considerations than the ones which most forcibly commend themselves to the judgment of those who are chiefly affected thereby. Indeed, it very often happens that the financial interests which have consummated the merger claim the privilege which commonly goes with control, and put at the head of the business, with large executive powers, a man who knows absolutely nothing about it, theoretically or practically, but who is, or is supposed to be, a past master of the art of manipulating the stock market and getting money when money is needed. There is a better reason for this than may appear at first glance. From the moment a merger is "financed" it ceases to be, primarily, a manufacturing proposition and becomes a financial problem of the most anxious kind. Very few of those who have been brought in by the opportunity of a profit from promotion have any idea of serious or permanent identification with manufacturing. They have blocks of securities of one kind or another, all of which are liens upon the assets of the merger, and to make these marketable, so that those holding them may get out to the best advantage possible, is obviously a matter of more immediate concern than volume of business, cost of production or manufacturing profit. Sordid details of this character are matters of very little concern to underwriting syndicates. When the "undigested securities" of the merger are masticated, if not digested, it will be time enough for those having more permanent interests involved to look after such matters.

But just about at this point in the history of the merger a difficulty is frequently encountered which was wholly unexpected and formed no part of the plans of those chiefly in interest. It grows out of the questions of management. Boards of directors are made up of men who have some knowledge of the business and men who have none at all. As the rule, the interests, aims and ambitions of these two classes point in diametrically opposite directions. In the selection of men to fill the executive positions, jealousies are developed, which would seem to be inevitable. There is better reason for this than is found in mere vanity or in disappointed ambition. In the necessary displacement from positions of large responsibility of men who have had life long identification with the industry, and who retain large interests, the value of which depends upon a much higher standard of efficiency and economy in management than was ever attained in the conduct of competing plants, those upon whom this management devolves find themselves surrounded by a cordon of critics quick to see every error or omission in the policy adopted, and equally quick to resent as an injury to themselves a failure to realize the advantages which were promised. It thus happens that in a great many instances the direction of mergers is disturbed and its commercial policy embarrassed by differences which gradually widen into dissensions. Bond-

holders and stockholders are apt to take sides in such quarrels, with the result that the courts are appealed to on one or another pretext, with demands for protection or relief; public distrust, never fully established, is shaken, and reorganization follows as a matter of course. Even when the courts fail to discover grounds for the creation of receiverships, the demand for judicial intervention makes public a great many facts which it was never intended the public should know, and distrust retards for a long time, even if it does not permanently prevent, the sale of securities at what the holders believe is their value. Under these conditions the disposition of the financial interests behind the management is more and more to assume control of their business direction and to push to the background, or it may be into practical banishment, the men who created the properties merged and made them sufficiently valuable to become attractive to promoters and bankers.

The requirements of mergers and "trusts" are creating industrial managers of a new grade—men who can handle large things in a large way; but it is scarcely probable that such men will ever acquire the mastery of detail and the intimate knowledge of local conditions which characterized the individual manufacturer doing business in competition with keen and aggressive rivals. It is certain that they cannot put themselves into the same intimacy of personal relations with their staff, which were quite possible in individual plants, and that under any possible system of merger management, or at least any system yet devised, the education of new men to succeed those now in charge is likely to be less thorough than it was under the old system. It would suit the financiers very well if great mechanical geniuses were content to occupy subordinate positions, attending strictly to business, and, by supreme efforts, earning interest upon any capitalization which it may suit the directory to agree upon; but great geniuses do not always see their own interests in self effacement. They are apt to have views of their own, and to hold them in the service of a merger costs so much that the expected economies in salary account are not always realized.

To what these tendencies lead and what significance attaches to them are questions well worthy of consideration as having an important bearing upon the future of industrial development in this country. The impression is gaining ground that in plants which have passed into the control of great combinations the critical visitor will fail to observe the evidence of close and systematic management which most interested him in successful independent plants. He sees more enterprise, perhaps, more extension and, it may be, a larger output per unit of labor cost due to improved machinery. Under the favorable conditions existing at the moment any lack of attention to details and to the small economies of manufacturing may be of small moment as affecting profit and loss; but how it will be five or ten years hence is a question not so wholly academic as it might appear at first glance.

CORRESPONDENCE.

A Question on Making Cost Estimates on Iron Castings.

To the Editor: Referring to the article signed "Beelzebub" in *The Iron Age* of June 25, we agree with "B." in the main, our exception being a slight reduction in average value of gateways, by reason of necessary addition of good soft pig iron to put same life into remelted gateways that they contained before remelting, and also take care of the second shrinkage. The proper percentage of this slight reduction would be determined by the kind of mixture used. BUGHOUSE.

BUFFALO, N. Y., June 26, 1903.

The Apprenticeship System at Brown & Sharpe's.*

BY WILLIAM A. VIALL, PROVIDENCE, R. I.

If our beloved President is impressed with the fact that certain classes of our people are guilty of race suicide, what would be his opinion regarding the machine tool builders? It seems as though but little, comparatively speaking, has been done toward preparing and fitting for our shops men to take the place of those who are passing from us. All larger manufacturers are undoubtedly constantly beset wth requests to recommend men for some of the smaller shops, and men are wanted for all positions, including managers, foremen and operators of special machines. While all of us are able to make more or less prompt deliveries on machine tools and to manufacture them without limit, we are not able to supply men.

The question of apprenticeship is one that has been of great interest to the company with whom I am connected, and since their inception it has been very faithfully and consistently followed out. We all know that plenty of so-called machinists are to be had, but unfortunately are very apt to belong to the "bum" class, and are not men who are able to do the work that is wanted of them; and in many cases, instead of having the well trained man, we are obliged to take men who are not only not fitted to do the work but are hardly fit to have about our shops, for they are not interested in their work. And this is due very much to lack of training.

Nearly two years ago E. H. Parks wrote to a large number of concerns regarding the system employed in their respective establishments on this matter of apprenticeship. The results of these inquiries were published in *Cassier's Magazine*, October, 1902, issue. He received 112 replies, in which it was found that 17 concerns had no system, and that but 49 require written agreements, and seven require deposits.

I appreciate the fact that the tendency of to-day is very largely to specialize among machinists, as well as among professional men, and there may be a feeling among some that there is not the demand for the all-round man that there has been. But I believe there is to-day a demand and an absolute necessity for a large number of these thoroughly trained men—men from whom we can select our foremen and heads of departments. In our own case, as I say above, we have consistently followed the system, and the result has been that we have been able to man our shop in its managerial departments very largely—in fact, almost entirely—with men who have been trained with us as apprentices. The technical school is doing a training that will furnish, in many cases, engineers, but it does not pretend to give the technical training that is necessary to give us the workmen that we need, and without workmen we can hardly obtain the results that we are endeavoring to obtain.

We all know the old style of apprenticeship system—that the employer took the young man into his family, and he was called upon to build fires, run errands, take care of the children and do any other odd job that might come along; and after a given time he was put forth as a journeyman, to finish up his course by traveling around from one shop to another in order that he might obtain a finish.

Modern methods would not allow of this practice, and to attend to the work more satisfactorily we deem it necessary to have the boys indented, and to this end we have drawn up and make use of a printed form. This paper is signed by the company, the apprentice and his parent or guardian.

Taking up this paper, and following out the various items, we would say that as to age, we find the limit, 16 to 18, to be a period that admits of their finishing their course before they have become too far advanced in age and consequently less amenable to instruction and discipline. That they must be physically sound goes without saying, for it is purposeless to train up young men who are not going to be able-bodied, as the time given to

* A paper read before the meeting of the National Machine Tool Builders' Association, at Worcester, Mass., June 10, 1903.

them is entirely lost. We have been obliged to pay some attention to education. I well know that it is not necessary for a good machinist to be able to know when Washington crossed the Delaware or when the Louisiana Purchase was consummated; but if we are to bring up a class of young men who are to be true representatives and men from whom we can draw our foremen and managers, they must have some idea of learning and a love for study. We have required the equivalent of our grammar school course, which presupposes that they know enough of mathematics to know the rule of three, have some idea of decimals, the metric system, &c. Like any education, it is not so much what the boy knows that we are looking to as it is to what he has been trained to, which makes him a much more apt pupil in the shop.

Very often we are approached by young men who think they want to learn a trade, and their parents wish to have them, who would be utterly unfit for such a work and really have no idea what it means. To indent such a person would be unjust to all parties, and we therefore have provided a term of trial, consisting of 480 hours. If during this time we consider that we wish the young man and he wishes to stay with us the papers are then signed, and these 480 hours are reckoned in with the first year's time. The apprentice must complete 295 days of actual work in a given year before he can start upon the year following, and his pay is regulated strictly according to this record. The company reserves the right to make such adjustment in the apprentice's time as they may see fit by reason of a difference in running time, as for example, short time or unforeseen breaks.

The only rule that we endeavor to maintain is to treat them all alike. As to the right to discharge for improper conduct, this is exercised only after all means have been exhausted to endeavor to bring the apprentice into line, and in this respect I believe that they have all been treated very fairly. Cases have come up where the court has been called upon to act upon our decisions, but we have been upheld in them.

As to the prices paid, 6, 8, 10 and 14 cents per hour for the respective years, I would say that in addition to this from time to time the apprentices are allowed to have piece work to help them to make whatever they can over and above their regular pay. The work is divided practically as follows:

			Weeks.
First year.	Lathe work: Tools	Single	40
		Double	10
Second year.	Drilling		6
	Milling		12
	Assembling		26
	Erecting		6
Third year.	Erecting		20
	Screw cutting		10
	General work		20
Fourth year.	General work		35
	Scraping		3
	Planing		12
Total			200

It is necessary to consider the work that is done, as in any educational system. It is not possible to turn out men who are finished products in any one line, but it does give the apprentices an idea of the general run of work, so that they are able to take hold and specialize later should conditions require it.

An Instructor of Apprentices.

One element that I believe is quite essential is that some one person should have charge of the apprentices. This is an idea that Richmond Viall held for a long while, but was not able to carry it into operation as early as he wished, as the foremen who had to do with the boys felt that they did not wish to be interfered with in this way. The system has been inaugurated, however, and I believe that not one of the men who have to do with it would care to return to the old system. Under the old system every boy was taught to do a piece of work as the one who had him working for him saw fit to teach him. As to the grinding of tools, the drilling of centers and like work, there would be as many different ways of doing it as there were men who had the apprentices in charge. And apprentices are often neglected because the foreman or some other person is too busy to attend to them. Given an instructor of apprentices, however, it is his duty to see that all are instructed in the same manner to do a given piece of work, that time is taken for it and that it is done properly. Then the general line of work is carried out under the supervision of the various foremen. This instructor of apprentices is also able to look out for those who are away from home. When they are sick or when they may need attention outside of working hours he is at liberty to follow them up and act for the company on behalf of the parents or guardians of the boys. When the number of apprentices is small it is not feasible to have one man devote his time to this work; but I believe that a man could be selected a part of whose duties would be the care of the apprentices.

In closing I am aware that the scheme that has been successful with the Brown & Sharpe Company would not lend itself to all localities and to all conditions, but I do believe that it contains food for thought on your behalf, and I trust the time is not far distant when all may have some form of apprenticeship in their shops that will help us to have a class of men in whom we can have confidence and who will be of material aid to us in our undertakings.

Another Illinois Steel Record.

CHICAGO, ILL., June 30, 1903.—The Bessemer department of the South Works of the Illinois Steel Company, on the night turn of June 26, produced 2024 tons of ingots and 180 heats, breaking its own 12-hour record of 1894 tons and 175 heats made on the day turn of June 24.

The machine shops in Greater New York and vicinity in which strikes were inaugurated some time ago by the International Association of Machinists are running at about normal capacity. To a representative of *The Iron Age*, H. C. Hunter, counsel of the New York Metal Trades Association, made the following statement: "In some shops the conditions are as though no strike was on, the places of the strikers having been filled through the efforts of the association. The association is decided in its attitude and will not make any concession toward the demand of the International Association of Machinists for a minimum wage scale of $3 per day. In the measures taken by the trades association, it is believed that the association is fighting the battle of all employers in Greater New York and vicinity. The plan of campaign of the machinists is to obtain a minimum rate for the marine shop and then insist upon the same demand from all other shops. According to reports there is no little trouble ahead for employers of machinists. A demand will soon be made for the abolition of piece work, and also for an eight-hour day. Strikes are already on in the Western cities to enforce the latter condition."

The proceedings in the application of dissatisfied bond holders for a receivership for the United States Shipbuilding Company have terminated in the decision by the court that the company are insolvent. At the hour of going to press the receiver had not been named, but indications point strongly to former Senator James Smith of New Jersey.

Cadwallader R. Mulligan, formerly general manager of the Dover Iron Company, Dover, N. J., has obtained control of the company, having purchased the holdings of the George Richards estate, Senator John Kean, Justice Mahlen Pitney, Henry Stafford Little, Frederick A. Potts and Albert Richards. The name of the company is to be changed July 3 to the Ulster Iron Works, and it is understood that the plant is to be considerably improved. The works contain one single and four double puddling furnaces, two heating furnaces and three trains of rolls. The product is bar iron, boiler rivets and brace jaws. The new Board of Directors consists of C. R. Mulligan, John Mulligan, Charles D. Fuller, Thomas W. Folsom and Edward Van Volkenburgh.

May Imports and Exports.

The imports of iron and steel fell off considerably in May as compared with April, according to the report just issued by the Bureau of Statistics of the Treasury Department. The quantity figures for May were 109,820 gross tons, as compared with 161,062 tons in April, 126,575 tons in March and 97,908 tons in February. It would appear from this comparison that the high point in our importations of iron and steel was reached in April, and that we can expect a continued rapid decline. The details for the month, as compared with the corresponding month of 1902, are as follows:

Imports of Iron and Steel.

	May,	
	1903.	1902.
Commodities.	Gross tons.	Gross tons.
Pig iron	57,139	30,708
Scrap	11,025	11,768
Bar iron	2,147	1,191
Rails	7,701	5,151
Hoop, band and scroll	12	5
Billets, slabs, bars, &c., steel in forms, n.e.s.	26,389	24,383
Sheets and plates	773	196
Tin plates and terne plates	2,444	6,380
Wire rods	1,673	2,174
Wire and articles made from	463	275
Chains	19	18
Anvils	35	38
Totals	109,820	82,287

The heaviest decline in the imports for May, as compared with April, occurred in pig iron. The April imports were 99,944 tons, as compared with 57,139 tons in May. Scrap shows a slight gain in May as compared with April. Bar iron is practically the same. Rails show a falling off of about 3400 tons, as compared with April. A decline of nearly 3000 tons occurred in steel billets, slabs, &c. Tin plates show a heavy falling off; the imports have been 6362 tons in April, as against only 2444 tons in May. Wire rods show a slight decline. In other respects the changes are insignificant.

The quantity figures of exports of iron and steel in May also show quite a shrinkage on April. The total for May was 24,751 gross tons, as compared with 32,593 tons in April, 26,627 tons in March and 21,727 tons in February. The exports had been increasing for three months up to April. The total is so small that an extended comparison of details is not specially necessary. The fact may be noted, however, that wire rods show a sharp decline, the figures for May being only 936 tons, against 5612 tons in April. The details for the month, as compared with the corresponding month of 1902, are as follows:

Exports of Iron and Steel.

	May,	
	1903.	1902.
Commodities.	Gross tons.	Gross tons.
Pig iron	882	1,679
Scrap	393	784
Bar iron	2,021	3,339
Wire rods	936	2,741
Steel Bars	1,318	649
Billets, ingots, blooms	57	303
Hoop, band, scroll	112	153
Iron rails	20	...
Steel Rails	295	8,031
Iron sheets and plates	309	259
Steel sheets and plates	1,678	2,267
Tin plates and terne plates	7	133
Structural iron and steel	2,881	3,530
Wire	9,744	10,987
Cut nails	677	1,190
Wire nails	3,160	2,716
All other nails, including tacks	261	128
Totals	24,751	38,889

The imports of iron ore for the 11 months of the fiscal year ending May 31, 1903, were 910,593 gross tons, as compared with 1,097,776 tons in the corresponding period of the previous year. The exports of iron ore during the 11 months of the present fiscal year were 76,120 tons, against 65,722 tons in the corresponding period of the previous year. Excluding ore, the total value of iron and steel imports in May was $3,679,821, against $4,643,010 in April, and against $3,263,361 in May of last year. Taking the 11 months of the current fiscal year, the total value of imports of iron and steel, excluding ore, was $47,012,535, as compared with $23,544,317 in the corresponding period of the previous year, thus showing that the value of the imports had doubled in that time. In the fiscal year 1900 the imports were only $20,000,000, and in 1899 only $12,000,000. The total value of exports of iron and steel, including such finished products as builders' hardware, cutlery, machinery, stoves, &c., was $8,330,063 in May, as compared with $8,392,108 in May of last year. The total for the 11 months of the current fiscal year was $88,169,525, as compared with $90,780,571 in the corresponding period of the previous year. This shows only a slight decline in the iron and steel export trade, which is, of course, due to the continued excellent foreign demand for the more highly finished products.

PERSONAL.

J. C. Maben, president of the Sloss-Sheffield Steel & Iron Company, has returned from a trip to Europe.

Camille Mercarder, of the Homestead Steel Works, of the Carnegie Steel Company, has returned from Europe. While abroad Mr. Mercarder attended the sessions of the Iron and Steel Institute and read a paper on "Hollow Forged Axles," which appeared in the issues of *The Iron Age* of May 7 and 14.

William Burlingham has accepted an appointment as chief engine designer with the B. F. Sturtevant Company of Hyde Park, Mass., resigning a position in the United States Inspection Office with the William R. Trigg Company of Richmond, Va. Mr. Burlingham has previously been associated with the Bath Iron Works, the General Electric Company, the Southwark Foundry & Machine Company and the Newport News Shipbuilding & Dry Dock Company. He is a graduate of the Worcester Polytechnic Institute.

The project of building a steel casting plant at New Castle, Pa., by P. McManus and those associated with him has been given up and Mr. McManus has accepted a position as superintendent of the Youngstown Steel Casting Company and will enter upon his duties at once.

Corrrespondence for Wallace Buell, who has just resigned as general sales agent of the Dominion Iron & Steel Company, should be addressed to the New York Club, Fifth avenue and Thirty-fifth street, New York, or to the St. James Club, Montreal.

Frank P. Filer has been made superintendent of the coal mines acquired by the United States Steel Corporation from the Sharon Coal & Limestone Company, Sharon, Pa. He is an experienced operator.

W. H. Crehan, formerly superintendent of the tube mills of the Youngstown Iron Sheet & Tube Company, at Youngstown, Ohio, has resigned and has been succeeded by Tenry Doyle, formerly of Spang, Chalfant & Co., pipe manufacturers, of Pittsburgh.

Samuel P. Harbison, president of the Harbison-Walker Refractories Company, Pittsburgh, has presented to Grove City College, Grove City, Pa., 250 shares of the preferred stock of his concern, the par value of which is $25,000.

S. K. Hine has been appointed manager of the Girard Iron Company, Youngstown, Ohio, to succeed the late J. A. Kennedy. Mr. Hine was superintendent of the plant under Mr. Kennedy.

William E. Corey, president of the Carnegie Steel Company, the National Steel Company and the American Steel Hoop Company, has been appointed assistant to the president of the United States Steel Corporation, to perform the active duties of the president, Charles M. Schwab, whose health continues poor. Mr. Corey has been identified with the steel industry for over 20 years and has been in the service of the Carnegie interests all of that time. He was born May 4, 1866, in Braddock, where his parents still reside. He became president of the Carnegie Company and of the Carnegie Steel Company on April 16, 1901. Mr. Corey invented an improved process of manufacturing armor, which is known to ordnance engineers as the "Corey reforging process." Mr. Corey will make his headquarters at New York. He will

for the present retain the presidency of the Carnegie Steel Company.

Charles A. Moore of Manning, Maxwell & Moore has returned from a trip abroad.

Labor Matters at Pittsburgh.

No Agreement Reached with Machinists.

At Pittsburgh a number of conferences have been held between the Manufacturers' Association, representing the machine shop operators, and a committee representing the International Association of Machinists, but as yet no agreement has been reached. The original proposition submitted by the machinists to their employers is as follows:

(Copy of agreement presented to the manufacturers by the International Association of Machinists.)

AGREEMENT.

THIS AGREEMENT, entered into this.....1903, by and between the firm of..... and a committee representing the International Association of Machinists, Witnesseth:

1. That during the term of this agreement there shall be employed in the shops of the parties hereto only members of the International Association of Machinists or person agreeable thereto.

2. That nine (9) hours shall constitute a day's work. NOTE.—Nothing in this agreement is to be so construed as to disarrange regular working time in vogue at present.

3. All time worked between the regular quitting time and twelve (12) o'clock midnight shall be paid for at the rate of time and one-half, all time worked between twelve (12) o'clock midnight and the regular starting time shall be paid for at the rate of double time. This clause pertains to day shifts only.

4. All machinists employed on regular night shifts shall be paid time and one-fifth for the first nine hours and time and one-half for all time worked in excess of nine hours.

5. That double time shall be paid for all work done on Sundays and the following holidays—viz., New Year's Day, Decoration Day, July 4, Labor Day, Thanksgiving Day and Christmas.

6. No piece work, bonus or premium system shall be introduced into the shops or shop of any party to this agreement.

7. That there may be employed one apprentice for each shop, and in addition not more than one apprentice for every five machinists regularly employed. Each apprentice shall serve an apprenticeship of not less than four years; he shall be given sufficient experience on the various machines and floor work to render him capable of doing any work that he may be called upon to perform.

8. For one year from July 1, 1903, an advance of fifteen (15) per cent. shall be paid to each journeyman machinist now in the employ of the parties represented in this agreement.

9. That the minimum starting rate for any machinist shall be thirty-three and one-third cents per hour.

10. That no manufacturer who is a party to this agreement nor his agent shall ask or require his employees to work or handle the product of unfair shops.

11. This agreement shall remain in force until July 1, 1904, and thereafter, unless either party gives ninety (90) days' notice to the other that they wish to withdraw or amend this agreement.

The above was carefully considered by the machine shop owners, and while much of it was satisfactory, special objection was found with No. 1 clause, which meant if adopted that only union men should be employed. Objections were also made to clause 8, which provided for an advance of 15 per cent. in wages, and to clause 9, which provided that the minimum rate for machinists shall be 33 1-3 cents per hour. Clause 10 was also objected to, as it meant that the machine shop owners should support a boycott against another shop should it be started. The machine shop owners held a meeting and carefully considered the agreement submitted by the men, after which the employers drew up a counter agreement, which is as follows:

PITTSBURGH, PA., June 25, 1903.

To the Machinists Employed by the Machine Builders of the Manufacturers' Association of Pittsburgh.

GENTLEMEN:

In reply to a request from the International Association of Machinists for an advance in wages and a number of changes in the shop conditions, will say that we were somewhat surprised that you made such demands, as, at the present time, the general tendency of business throughout the country indicates lower prices in all lines, and a decrease in the volume of business for the coming year; and as labor is affected with the decrease in the prices of materials and a reduction in the volume of business, the manufacturers of Pittsburgh do not think that the outlook for the coming year justifies any advance in wages.

We also wish to call your attention to the fact that the machinists in the Pittsburgh district at the present time are being paid as high wages as any other district in the United States, and higher wages than 90 per cent. of the districts outside of Pittsburgh. While we want you to feel that we wish to meet your views as far as practicable, it would be foolish for us to agree to pay you so much higher wages, which would prevent us from taking orders in competition with the outside manufacturers, as it would mean a reduction in our volume of business and also a great reduction in the number of machinists we would employ. This in return would compel a number of machinists to seek employment in other districts at lower wages than we are paying at the present time.

The Manufacturers' Association, during the past sixty days, has had a number of meetings in order to thoroughly discuss your demands and the general trade conditions for the coming year, and we can assure you that we wish to continue the pleasant relations and good feeling which have existed between the manufacturers and machinists during the past year, and are anxious to do everything we can to continue these relations during the coming year, if we can possibly do so, and therefore have decided to offer you the agreement below, which we trust you will find satisfactory.

You will note that the first clause in our agreement is somewhat different from the first clause in the agreement presented by the International Association of Machinists. The first clause in this agreement is unconstitutional, as it would be taking away the liberty of some of the machinists that are employed in this district, to which we will not agree.

We also call your attention to Paragraph 10 in agreement presented by the International Association of Machinists, which relates to handling the product of unfair shops. This would be impracticable, and we will not accede to it.

Yours respectfully,

THE MANUFACTURERS' ASSOCIATION OF PITTSBURGH.

AGREEMENT.

THIS AGREEMENT, entered into at Pittsburgh, Pennsylvania, this first (1st) day of July, A. D. 1903, by and between a committee representing the machine builders of the Manufacturers' Association of Pittsburgh and a committee representing the International Association of Machinists of Pittsburgh and vicinity, District Lodge No. 6.

ARTICLE 1. The purpose and intention of this agreement is to bring about a harmonious feeling between the members of the Manufacturers' Association of Pittsburgh and the machinists employed by them, thereby assuring the manufacturers that they will receive a fair day's work from the machinists in their employ and that the machinists will receive a fair wage for their services while in the employ of the members of the Manufacturers' Association of Pittsburgh. Freedom in the employment of labor and the right of organization shall be recognized by both parties hereto.

ARTICLE 2. Hours. Nine (9) hours shall be the standard workday, except where additional time is required to be worked on account of the Saturday half holiday during the months of June, July, August and September, in order to make up the fifty-four (54) hours per week. Fifty-four (54) hours shall be the standard week's work for the night shift, and to be worked during the following nights: Monday, Tuesday, Wednesday, Thursday and Friday.

ARTICLE 3. Overtime. 1.—Day shift. Time and one-half to be paid for all time worked over the regular day's schedule up to twelve o'clock midnight. After twelve o'clock midnight, Sundays and legal holidays—viz.: Fourth of July, Labor Day, Thanksgiving Day and Christmas Day—to be paid at the rate of double time, except on company's own repairs to its machinery, so that factory may be in running order the following day, when time and one-half is to be paid. 2.—Night Shift. All times worked over fifty-four (54) hours per week shall be paid at the rate of time and one-half. In case of night shift entering holidays, single time is to be paid; time worked on nights of holidays, double time.

ARTICLE 4. Apprentices. In shops where the present number of apprentices does not exceed one for the shop, regardless of the number of machinists employed, and one to every five machinists thereafter, this proportion shall not be exceeded; where the number of apprentices is in excess of such rate, a reduction shall be effected as far as practicable during the life of this agreement, provided the continued employment of apprentices now in service shall not be affected.

ARTICLE 5. Wage scale. Beginning July 1 all machinists employed by the members of the Manufacturers' Association of Pittsburgh shall receive an advance of five (5) per cent. in their wages.

ARTICLE 6. Arbitration. Should any differences arise between the parties hereto in the interpretation of this agreement, or from any other cause, which cannot be adjusted between them, the parties aggrieved shall submit their differences, in writing, to the other party, and if they cannot agree within ten days the question shall be submitted to a committee to consist of four (4) members, two (2) selected by each party, and if this committee cannot agree, a fifth disinterested party shall be selected by the first four, who shall constitute a board of arbitration to adjust such differences, and while said differences are pending before the board of arbitration there shall be no lockout or strike, and the decision of the board of arbitration shall be final and binding on the parties hereto during the term of this agreement.

ARTICLE 7. This agreement shall remain in force until July 1, 1904, and thereafter, unless either party gives ninety (90) days' notice to the other that they wish to withdraw or amend this agreement.

This was submitted to the committee representing the machinists with the result that a mass meeting of the machinists was held in Pittsburgh on Sunday, June 28, at which the men agreed to withdraw their demand that shops employ only union labor, as set forth in clause 1 of their proposition. They also struck out clause 9, relating to a minimum rate of 33 1-3 cents per hour for any machinist, as the employers absolutely refused to be bound by any minimum rate. The men also agreed to accept an advance of 10 per cent., instead of 15, as originally proposed. With this amended proposition the men asked for another conference with their employers, which was held in the rooms of the Manufacturers' Association, Pittsburgh, on Tuesday, June 30. No agreement was reached, but the only contention now is over the 10 per cent. asked by the men, the employers being willing to concede an advance of 5 per cent. The machine shop owners have asked the committee of machinists to present this to their members, and a meeting of the machinists will likely be held in Pittsburgh on Wednesday evening, July 1. It is the impression that if the men will agree to accept an advance of 7½ per cent. the employers will grant it and the scale will be signed. The men have been advised to continue at work for a few days pending another conference with their employers, and they will probably do this. Indications strongly favor a settlement before this week is out.

Labor News.

By the acceptance of a plan of arbitration submitted by the George A. Fuller Company to the United Board of Building Trades of New York City, the building unions have removed the strike ban from the buildings under construction by the Fuller Company. The terms of this contract provide that all the men will return to work immediately pending the result of arbitration, and the Fuller Company have secured the pledge of the labor unions to extend the plan to any other employers who may be willing to accept its terms. Thus far none of the other employers have shown a willingness to adopt the plan, and all of the employers of New York City but the Fuller Company state that they will hold out until the unions accede to the original plan offered by the Employers' Association. It is variously estimated that from 700 to 20,000 men will return to work on the Fuller buildings as a result of the adoption of their plan. The unions make the 20,000 claim. The Fuller Company are not affiliated with the Employers' Association.

The agreement provides for an arbitration board to be composed of two persons nominated by the contractor, neither of which shall be an officer, employee or stockholder of the contractor, and two persons nominated by the union, neither of which shall be a member of the union. These four shall choose an umpire. An important provision is that "in the event of a controversy between two unions, both belonging to the same central body, either the contractor or the union may refer the controversy to said central body, in writing, for disposition, and both the said unions and the contractor shall be governed by such decision. If, however, the two unions are not members of the same central body, then the contractor may insist that the two unions shall arbitrate their differences before a board to be composed of four persons, two each to be chosen by the respective unions, and an umpire to be chosen by the four." Union men are to be exclusively employed, even by subcontractors.

CHICAGO, ILL., June 27, 1903.—The general tendency in the Chicago labor field has been toward improvement rather than otherwise, but there are still minor strikes and labor agitation of an aggravating though not serious nature, and the outlook seems to be favorable for a further settling of present difficulties. Machinists and hoist operators at several of the local steel plants have been giving some trouble recently and their disaffection causes annoyance but no serious inconvenience to the works affected. The strike of the freight handlers at the Chicago & Alton road has resulted in a victory for the railroad company, and a movement is on foot for a peaceful settlement of the pending strike of the freight handlers at several of the large dry goods warehouses in the city. Several towns within a radius of a hundred miles or so of Chicago have felt the effects of labor agitation more than heretofore, but a full settlement of difficulties is anticipated within a few days.

Molders employed by various Springfield, Ill., foundries are demanding an increase from 28 to 30 cents an hour. The employers do not anticipate a strike, inasmuch as such action would be in violation of a present agreement between the National Founders' Association and the Molders' Union. The proposition submitted by the men is now being considered by the officers of the National Association.

The Ætna Foundry & Machine Company, Springfield, Ill., have granted a 2-cent advance per hour in the wages of their molders, who after July 1 will receive 30 cents an hour.

The Springfield Boiler & Mfg. Company, Springfield, Ill., have made a settlement with their blacksmiths, pattern makers, carpenters and laborers, who recently struck for ten hours' pay for nine hours' work and an additional 2 cents per hour by granting 1 cent an hour increase in wages. The boiler makers, however, have refused to accede to the company's concession and are still holding out for their original demand.

NEW LONDON, CONN., June 29, 1903.—The Eastern Shipbuilding Company of Groton, Conn., are now operating all departments of their works, and work is progressing on the steamship "Idaho" on the ways, and on the "Minnesota," already launched. The company closed their gates on the morning of June 11. A meeting of their workmen was held the evening before and took final action on their demand for a nine-hour day with ten hours' pay. The attitude of the workmen was menacing. Therefore, it was decided by the officers of the company as soon as they learned of the action of the employees, which was the same night, to lock out everybody. Every employee in the office as well as in the shops and yard was paid to date. Thus 1200 men were put out of work. Their employees made application for positions, their names were taken and each case was considered separately. As soon as a small force was back they were put to work cleaning up and on repairs. The number gradually increased, but not so rapidly as many applicants for work among employees would have wished to see. The company went at the task of re-employing with considerable deliberation. Monday, June 29, 76 men were added to the force. Other applicants had their cases taken under consideration. The number of men re-employed had grown to about 580. The old ten hours' basis was retained. The Eastern Company have not lost a great deal of time by the lockout. The wet weather came about coincident with the shutdown, so that had there been no trouble work on the two big ships would have been abandoned most of the time. Work had previously been rushed. The strike in New York shipyards sent several hundred workmen to Groton and the company got some weeks of this extra force, which, however, left to return to their old places as soon as the New York strike was declared off. It is expected that the "Idaho," twin of the "Minnesota," will be launched in the late fall, and also two steel car floats, each 318 feet long, for the New York, New Haven & Hartford Railroad Company, which are now being laid down.

BRIDGEPORT, CONN., June 30, 1903.—The situation in the machinists' strike at Bridgeport remains unchanged. The machinists in all other shops than those of the Yost Typewriter Company and the Pacific Iron Works are at work, and there seems to be little chance of further trouble. The places of the strikers at the Yost and Pacific Iron Works shops are being filled.

Thayer & Company, Incorporated, general Eastern agents for the Cahall vertical and horizontal water tube boilers, have removed their Philadelphia offices from 542 Drexel Building to 342 Land Title & Trust Company's new building, northwest corner of Broad and Sansom streets.

MANUFACTURING.

Iron and Steel.

The rollers, doublers and heaters in the plate mills of the American Tin Plate Company, New Castle, Pa., district will meet in a few days to decide upon an increase of wages to roughers, heaters' helpers and doublers' helpers commensurate with the increased output recently allowed by the Amalgamated Association in tin plate mills.

The project to erect a large steel casting plant at New Castle, Pa., by some capitalists of that place has been deferred for the time being.

The Shenango Iron & Steel Company, Shenango, Pa., have been organized with a capital of $200,000 and application has been made for a charter. The new concern will take over the plant of the Continental Iron Company, at Wheatland, Pa., recently sold at public auction and the output of which is skelp and plates of small sizes. The new company are composed of Samuel McClure of Sharon, D. L. Wilson and A. W. Herron of Pittsburgh, and Mason Evans of Youngstown, these parties representing former creditors. It is said the plant will be remodeled and some new finishing mills added.

The new works of the Liggett Spring & Axle Company, at Monongahela, Pa., on the Pittsburgh & Lake Erie Railroad, which have been in course of erection for some months, are nearly completed and will probably start early in September. A town is being founded at this place and will be known as Axleton. The present works of the company in Allegheny, Pa., will be removed to Monongahela as soon as the new plant is finished. The engines for the new plant are in place and consist of five 125 horse-power gas engines, each operating an electric generator furnishing the power for the different motors running their respective lines of shafting. The axle machinery has been purchased from various parties dealing in this special line of machinery, the Bement-Miles Company of Philadelphia having furnished the steam hammers, Spear & Riddle Company of Wheeling, W. Va., the axle turning and polishing machinery. The shears have been made and delivered by the Cleveland Punch & Shear Company, and the axle forging machinery by the Ajax Mfg. Company of Cleveland.

The Utah Iron Company, Salt Lake City, Utah, have filed articles of incorporation with a capital stock of $1,000,000, divided into 500,000 shares at a par value of $2 each. The officers of the company are: President, Thomas Marioncaux; treasurer, Edward Horne, and secretary, Fred. T. McGurrin, who together with Joseph Hause and James T. Hammond, constitute the Board of Directors. The company have secured a section of land in Iron County, Utah, and propose to ship and sell ore in the raw state and to erect and operate plants for the manufacture of iron and steel products suitable to the demand of the market in that territory. A railroad is being built into the ore lands and operations will begin as soon as this is completed.

The National Steel Foundry Company, New Haven, Conn., have just laid the foundations for a foundry and molding building, each of which is to be 60 x 408 feet, and they will also erect a pattern storage building 53 x 110 feet, five 10-inch water seal gas producers and producer shed, also a suitable power plant to drive their entire plant by motors. The foundry will at first be equipped with two 25-ton open hearth furnaces.

The Atlanta Tin Plate Company of Atlanta, Ind., organized about a year ago, have completed their buildings and machinery is now being installed. The factory will give employment to 300 persons. At the annual meeting of the stockholders at Atlanta the following directors were elected: John Kemp and W. A. Marker of Tipton, Henderson Coppock of Ekin, Walter Jones of Atlanta, and H. B. Hibben of Indianapolis. Subsequently the board organized by the election of the following officers: President, J. M. Whisler; vice-president, D. C. Hobbs; treasurer, E. S. Walton; secretary, H. A. Rhoades, all of Atlanta.

The Worcester works of the American Steel & Wire Company continue to be rushed with business. Every department is running with full force of men and with night and day gangs, yet there is no sign of cessation of orders, although at this time of year a falling off of business might very well be expected. The other wire companies of Central Massachusetts are equally prosperous.

The Macungie Furnace, at Macungie, Lehigh County, Pa., will be put in blast in July. A reduction of 10 per cent. in wages has been made.

James Lord, manager of the Lebanon plants of the American Iron & Steel Mfg. Company, denies the report that their mills will totally suspend operations this summer, except for a week beginning July 3. The mills are now working less than full time on short orders.

The bar mill of the Reading Iron Works, at Danville, Pa., will be closed on July 3 for repairs. The shut down will be shorter than usual.

We are officially advised that the reports in the daily press to the effect that the Eastern Steel Company of Pottsville, Pa., have closed their entire plant, owing to the lack of necessary material, are absolutely without foundation; in fact, the company are pushing forward the work upon their plant as rapidly as possible, and there has been no cessation in work to that end from the beginning. If they meet no unexpected delays in delivery of machinery, the company hope to be ready for full operation before January. The open hearth furnaces are expected to be completed by November 1.

The repeated statement that the American Sheet Steel Company would spend $500,000 at the McKeesport works in improvements and building new mills is incorrect. The only new work under way at this plant is the erection of a steel building to replace a present wooden building, and the elevation of the mills to put them above flood stage. The whole plant is to be made more modern, which may slightly increase the present output. Other than the above nothing is contemplated at this plant.

General Machinery.

F. H. Cook & Co., Leominster, Mass., manufacturers of machinery and tools, are building a brick machine shop, 38 x 90 feet, two stories and basement.

A turret head lathe and a few other tools will be required by the Athol Pump Company, Athol, Mass., who are enlarging their plant by raising the roof, making a 2½-story building. The company have recently installed some new tools, including a two-spindle Barnes drill and a Lodge & Shipley engine lathe.

The A. J. Cleveland Machine Company, Minneapolis, Kan., report that they have just completed the rebuilding of their foundry and machine shop and are now ready to resume business.

The American Blower Company of Detroit, Mich., have recently secured the order for three heating outfits to be installed in the new factory of the Packard Motor Car Company of their own city. They also have orders upon their books for apparatus to be installed in the factory of Pettibone, Milliken & Co., Chicago; Jas. Leffel Company, Springfield, Ohio, and the Baltimore & Ohio round house at Keyser, W. Va. The "A B C" apparatus will be used in the new Senate House at Trenton, N. J.; Maryland Theatre, Baltimore; a large new school in Washington, D. C.; public schools Nos. 24 and 34, New York; First National banks of Chicago and Cincinnati. The company also have recent orders for dry kilns from the Mengel Box Company, Louisville, Ky.; Otter Creek (Fla.) Lumber Company; Walsh Mfg. Company, Frederic, Mich., and the Tuna Mfg. Company, Bradford, Pa.

The Page-Storms Drop Forging Company have taken a five years' lease with the option of a five years' extension, of the plant of the Springfield Drop Forging Company of Springfield, Mass. The company will operate the new plant as well as their plant at Chicopee Falls, adjacent to the plant of the Stevens Arms Company. The offices will be at the Springfield plant, and the name of the company, who are a firm, will be known as the Page & Storms Drop Forging Company, successors to the Springfield Drop Forging Company. There are 12 power hammers at the Springfield plant, and the number will be increased to 15 and perhaps to 20 under the present plan. The Page & Storms Company began business two years ago, while the Springfield Company have been in existence for 12 years.

W. F. Chickering, speed lathe manufacturer, at Worcester, Mass., has removed his business to a room in the plant of the Worcester Emery Wheel Company on Chandler street.

A good sized lot of machinery and tools are required by the Richmond Foundry & Mfg. Company, 517 Market street, San Francisco, who were recently incorporated with a capital stock of $100,000 for general foundry and machine work and the manufacture of hardware specialties. The company have secured a site in Richmond, Cal., on the Santa Fé and Southern Pacific railroads and connecting by ferry with San Francisco, where they are erecting a plant which will be equipped throughout with modern appliances. The plating department will be one of the largest and best equipped plants on the Pacific Coast. The first building is nearly completed and contracts for equipment will be let within a few days. They expect to be in operation by the middle of August, employing at the start about 50 men. With the already established and growing demand for manufactured articles on the Pacific Coast, Hawaiian Islands, Australia, Philippines and the Orient, the company anticipate a brilliant future. H. A. Potter is secretary.

The Pilling-Kruse Air Engine Company have become established at Bucyrus, Ohio, and will manufacture compressed air hoisting machinery. The company consist of W. H. Picking, president; P. J. Carroll, vice-president; J. L. Pilling, general manager, and R. J. Kruse, mechanical engineer. The company have secured temporary quarters, but expect soon to erect a plant suitable to their requirements.

The Crestline Pump Works of Crestline, Ohio, have placed a contract for the erection of an addition to their plant.

The Akron Machine Company of Akron, Ohio, have been declared bankrupt by Referee D. A. Doyle. The petition was filed by the Merchants and Farmers' National Bank of West Newton, Pa. The liabilities are $34,357.08 and the assets $108,143.93.

At a meeting of the Wilson Laundry Machinery Company of Columbia, Pa., it was unanimously decided to increase the capital from $75,000 to $150,000. A new machine shop is in course of erection. The president's report shows that orders

are limited only by the capacity of the plant. The board declared a semiannual dividend of 5 per cent. and placed a good sum to surplus. These directors and officers were elected: William B. Given, president; C. W. Bender, secretary and manager; O. M. Hoffman, treasurer; E. G. Smith, superintendent; J. A. Meyers, H. F. Bruner, M. S. Shuman, William Morris, John Westerman, Frank S. Given and Henry Westerman, directors.

The Lehigh Valley Railroad Company are erecting extensive shops at Sayre, Pa., at a cost of $3 000,000. The machine and boiler shops will be 366 x 794 feet; storehouse and blacksmith shops, each 130 x 360 feet, and the power house, 100 x 300 feet. The entire plant will be operated by electricity.

Power Plant Equipment.

It is understood that the recently organized Glenville Power & Water Company of Greenwich, Conn., are to develop the watershed near Riversville, on the Byram River. They will supply both water and power to towns in Connecticut and New York. William J. Tingue is interested.

The Holliday Mfg. & Engineering Company, Chicago, have been incorporated with a capital stock of $15,000, the incorporators being Thomas Holliday, A. C. Tyler and O. J. Shannon. The new company will take over the business of manufacturing gas and gasoline stationary, portable and marine engines heretofore conducted by Thomas Holliday at 214 South Clinton street.

The New Castle Electric & Mfg. Company have erected a building at Park Gate, near Ellwood City, Pa., and have begun the manufacture of gas engines under patents owned by them.

The capacity of the Fannie Furnace, West Middlesex, Pa., will be materially increased by repairs and improvements now being made on the plant.

J. G. Blount & Co. of Everett, Mass., are installing a 60 horse-power Harris-Corliss engine to supply power for their machine shops.

The Stamford Motor Company, Stamford, Conn., recently incorporated with a capital stock of $100,000, have installed a new shop for the building of gasoline engines, boats, &c. All equipment has been purchased. C. H. Lounsbury of Lounsbury & Sarle is one of the directors.

Water is to be used as the motive power in running the electrical transmission plant which the Dunedin Tramways Company of New Zealand are about to erect. Pending the completion of the transmission plant, a temporary steam plant will be put in. The transmission scheme includes the erection of a power house on the banks of a river 20 miles from the city, where three-phase current will be generated by turbine driven alternators and transformed up to 15,000 volts for transmission. From a point near the city the main transmission line will be divided and branch off to the various substations, which will be equipped with Westinghouse rotary converters, with storage batteries and all necessary appliances. The designs for the whole scheme were carried out by Noyes Brothers of Sydney, Australia, and the work of construction will also be under their control. All motors and other electrical machinery will be supplied by the British Westinghouse Electric & Mfg. Company, Limited, the cars being furnished by the J. G. Brill Company of Philadelphia.

The Supplee Steam Engine Company of Columbia, Pa., have received an order for 60 pumps for a Pittsburgh iron mill. Orders for furnishings for a blast furnace at Buffalo, N. Y., were also booked during the week.

The boiler making department of the Titusville Iron & Steel Company of Titusville, Pa., has been closed for an indefinite period. Officials of the company refuse absolutely to discuss the cause for suspension. One hundred and thirty workmen are affected. The remainder of the works is running full time.

The Manchester Traction, Light & Power Company of Manchester, N. H., have let the contract, through French & Hubbard of Boston, consulting engineers, for building the dam and addition to the power station at Garvin's Falls, with space for four more 650-kw. General Electric generators, each direct connected to water wheel shaft, on which are mounted three 39-inch McCormick wheels, built by the Rodney Hunt Machine Company of Orange, Mass. The intention of the company is to install only two new generators, which will give a station capacity of 4800 horse-power, but as the load increases the capacity will be increased to the full power of the Merrimack River, on which the station is located.

The Holyoke Water Power Company, Holyoke, Mass., will erect an auxiliary power plant to use the water that now runs to waste over their dam. The company expect that they can develop several thousand more horse-power during a greater part of the year.

Reports from Asheville, N. C., state that George W. Vanderbilt has acquired a large tract of land between Hendersonville and Brevard, N. C., where he will construct a model manufacturing city, including water works, electric lighting, heat and power plants.

The municipality of Halstead, Minn., will receive bids until July 15 for the construction of a water works system.

The Department of the Interior, Office of Indian Affairs, Washington, D. C., will receive bids until August 4 for the construction of a water system at Umatilla School, Ore. Charles Wilkins, Pendleton, Ore., is superintendent.

The Erner Electric Company of Cleveland have received a contract for the power, wiring and lighting for the passenger car paint shop, repair shop, freight car shop, wood working mill, car machine shop and freight car shop of the new shops of the Lake Shore & Michigan Southern Railway Company, at Collinwood.

Foundries.

The Burlington Foundry Company, Burlington, Kan., have succeeded to the business of G. W. Reams & Sons. The officers of the new company are G. W. Reams, president; H. L. Jarboe, vice-president, and Ara W. Pratt, secretary and treasurer. The company will enlarge their plant throughout and install additional machinery.

The Wheeler Forge-Rolled Steel Wheel Company have incorporated with a capital stock of $300,000 for the manufacture of steel wheels and other railroad equipment. The company's headquarters are located at Harrisburg, Pa., care of Frank A. Wheeler, Post Office Box 439.

The American Car & Foundry Company's branch office at Terre Haute, Ind., has secured the contract for supplying the Chicago & Eastern Illinois Railroad shops at Danville, Ill., with castings for one year. The Terre Haute plant also furnishes castings for the Vandalia, Big Four and Evansville & Terre Haute railroads.

The El Paso Foundry & Machine Company, El Paso, Texas, expect to move their plant to a larger site, the present intention being to occupy about 10 acres. Another matter under contemplation is the establishment of a steel plant to be run in connection with their iron business.

The Shunk Plow Company of Bucyrus, Ohio, manufacturers of steel plows and steel wagons, are preparing to erect a foundry, 60 x 200 feet. It will be located on a new site adjoining the Ohio Central Railway tracks, and it is the intention to later erect other buildings there.

The Standard Foundry Company have been incorporated at Buffalo, N. Y. The directors are Edmund B. McKenna, Ralph Kimberly and Frederick H. Williams, all of that city.

The Acme Steel & Malleable Iron Works, Buffalo, N. Y., are putting up a very complete and handsome office building, and are also adding to the plant a building in which the shipping department will be installed.

The new foundry of the Whittier Machine Company of South Boston, Mass., will be of brick and steel, 76 x 220 feet, and one story high. The Beacon Engineering Company of Boston are the engineers.

There is no foundation for the current report that the Central Foundry Company were to start up their idle plant at Gadsden, Ala. The company inform us that they have not had any such move under contemplation.

Ground has been broken for a new foundry for Harmance & Marsh of Williamsport, Pa., adjoining their present plant. The building will be 38 x 80 feet, two stories in hight.

Bridges and Buildings.

The Buffalo Structural Steel Company have commenced the erection of a large addition to their plant, on Dart and Letchworth streets, Buffalo, N. Y.

Fires.

The plant of the Riddle Coach & Hearse Company, Ravenna, Ohio, was destroyed by fire June 28, causing a loss of $250,000.

Fire in Milwaukee, Wis., June 27, did $500,000 damage, the principal sufferers being the American Malting and Kraus-Merkel Milling companies.

The West Pascagoula Creosote Works, West Pascagoula, Ala., were destroyed by fire June 29; loss, $200,000.

The plant of the Cincinnati Abattoir Company, Cincinnati, Ohio, was recently destroyed by fire, entailing a loss of $125,000.

The Adkins, Young & Allen Company, Limited, manufacturers of steam and power pumps, air compressors, &c., 14 North Canal street, Chicago, suffered somewhat recently as a result of fire in the building in which they are located. The damage, however, was simply a water loss, fully covered by insurance, and the company continue to take care of all orders.

Hardware.

John Jaques & Son, Worcester, Mass., are building an addition to their shears shop. The new building will be 28 x 30 feet and two stories high.

The Colorado Moline Plow Company have been organized as a branch of the Moline (Ill.) Plow Company, for the purpose of establishing an office at Denver, Col., and selling the main company's product in that territory. The Colorado branch house is organized with a capital of $50,000 under the laws of Illinois.

The Union Furnace Mfg. Company, Morrell, Pa., whose shovel manufacturing department was burned out in September last, expect to have their buildings finished and the works in running order by August 1 next. Within ten days of the fire the company resumed the manufacture of shovels in temporary

quarters. Injuries to machines that passed through the fire were such that they could be repaired and again put to use. Several new machines are also being added. Among these are two 50-pound and one 15-pound Bradley hammers, two trimming presses and one 1000-pound drop press, from the Frankfort Machine Works, Philadelphia. The capacity of the works will be almost doubled. The lines of manufacture are shovels of all kinds, hot air registers, curry combs, trowels, oil cans, malleable iron rakes, hoes, &c.

The Barclay & Foster Implement Company, who were organized last fall, have decided to locate at Madison, Wis. The American Plow Company, as successors to the Barber & Foster Implement Company, have been incorporated with a capital stock of $200,000. James Barclay of Moline, Ill., formerly treasurer and superintendent of Deere & Co., and recently superintendent of the J. I. Case Plow Works, Racine, Wis., and C. T. Foster are chiefly interested. Plans are ready, and the work of erecting a complete plow factory will begin at once. A full line of plows and cultivators will be manufactured. Patterns and sample plows have been made in Moline, so manufacturing operations will commence as soon as the plant is ready.

The Chattanooga Roofing & Foundry Company, Chattanooga, Tenn., have lately completed a large addition to their already extensive plant, which improvement has been made necessary by their rapidly growing business in sheet and cast metal building material and sheet iron specialties. They have also installed an electro-galvanizing plant for the purpose of galvanizing their New Century patent shingles. They have adopted the cold electric process of galvanizing, as it is said to be peculiarly adapted for metal shingles. A full description of the process is given in their special shingle circular. They have also added to their long line of sheet iron specialties air tight heaters which are said to possess some new features. The demand for their building material is reported far in excess of former years. They have recently furnished their cast architectural iron and galvanized iron work for buildings being erected as follows: Comfort Trading Company, Boston, Ga.; S. M. Clyatt, Tifton, Ga.; P. M. Morris & Sons, Concord, N. C.; Finkelstein Bros., El Campo, Texas; G., H. & H. freight depot, Galveston, Texas; five store buildings, Blytheville, Ark.; Walker Building, Birmingham, Ala.; court house, Woodville, Miss.; three store buildings, Grayson, Ky.; three store buildings, Pavo, Ga.

The Kenton Hardware Company, Kenton, Ohio, have placed contracts for the erection of a new factory building in Kenton. The company's large plant was destroyed by fire some months ago, and the matter of their rebuilding in that place has been in doubt for some time, as they had received propositions from other cities.

The plant and business of the Sun Mfg. Company of Greenfield, Ohio, is to be removed to Columbus, Ohio, and a contract has been let for a factory building to cost $30,000, to be erected in that city. A. E. Shaner, Frederick W. Hubbard, W. A. Gill, Charles R. Martens and F. R. Leonard of Columbus are now interested in the company. They will manufacture cash registers, coffee mills and other specialties.

Iron and Industrial Stocks.

General conditions during the week have favored higher prices. The United States Steel stocks were conspicuous in this respect, a sharp advance having been made on Tuesday, which is ascribed to an intention on the part of controlling interests to keep prices up to a level that will at least equal the rate paid by the workmen who subscribed for preferred stock. Reports had become widely current that considerable dissatisfaction existed among the workmen when the price of the preferred stock dropped $3 to $4 per share below the rate which they had agreed to pay. Prices of other stocks were sympathetically affected by the strength of steel stocks, but it must also be said that general financial conditions have latterly been more favorable to stock strength. An exception to the general upward movement is noted in the case of Colorado Fuel, which receded after the recent change in the management, probably because those who were seeking control had secured all the stock they needed. Sales were made as low as 61½ on Wednesday. The United States Steel 5's were pressed for sale the latter part of last week, touching 81⅞, since which time they have improved decidedly, reaching 83⅝ on Tuesday.

The United States Cast Iron Pipe & Foundry Company.—The stockholders of the United States Cast Iron Pipe & Foundry Company held their annual meeting in Burlington, N. J., on June 25, and indorsed the management of the company, which had recently been attacked by A. H. McNeal, an ex-director. In regard to this attack the stockholders adopted the following resolution:

Resolved, That the stockholders here assembled, representing holdings of more than two-thirds of the capital stock, denounce the action of Andrew H. McNeal and his unwarranted attack upon the credit of this corporation. We have full and perfect confidence in the management, in the accuracy of the financial exhibit as made by the Audit Company, and in the absolute financial soundness and strength of the corporation. The quick cash assets exceed the current accounts payable four times over, and the name of the company is not upon a single discounted bill. The conservative policy of the management has been such that more than two dividends have been earned for each dividend declared. We urge the executive officers to vigorously defend Mr. McNeal's suit, not only for the purpose of winning it, but for the purpose of disclosing the malicious purposes which have inspired his conduct.

The annual report of the president also contained a caustic reference to Mr. McNeal, who was resident manager of the Burlington plant until about a year ago, when he was removed for special reasons, since which time he had endeavored to injure the company, instituting several suits. The entire Board of Directors was re-elected for the ensuing year by unanimous votes, as follows: Colgate Hoyt, George J. Long, C. E. Burke, R. F. Overholt, A. N. Brady, P. J. Goodhart, W. T. C. Carpenter, George B. Hayes, A. C. Overholt, E. R. Thomas, A. F. Callahan, E. C. Fuller, David Giles and B. F. Naughton. Immediately after the stockholders' meeting the Board of Directors organized, re-electing all the old officers of the company, as follows: President, George B. Hayes; first vice-president, George J. Long; second vice-president, A. F. Callahan; secretary and treasurer, B. F. Naughton. The Executive Committee is as follows: Colgate Hoyt, A. C. Overholt and A. N. Brady.

The stockholders of the William Cramp & Sons Ship & Engine Building Company, at a special meeting held in Philadelphia on June 25, approved the increase of the capital stock of the company from $5,000,000 to $6,250,000 and the increase of the mortgage indebtedness from $1,800,000 to $7,500,000. John W. Grange and Andrew H. McNeal, stockholders of the company, who have entered suit to prevent the increase in the capital and of the mortgage indebtedness, attended the meeting and protested against approving the increase.

Following the meeting of the directors of the American Locomotive Company June 24, when the regular quarterly dividend on the preferred stock was declared, this statement was given out by President Callaway: "The earnings of the company for the year ending June 30, 1903, with the month of June partly estimated, were $32,863,730, an increase over the previous fiscal year of $6,465,337. Over $4,000,000 has been expended in enlarging the different plants and in introducing modern machinery. The work of improving and enlarging the plants now outlined and authorized by the directors will be completed during the next fiscal year. The expenditure already made has produced an increase in the output of 40 per cent. The company have orders for a large number of engines to be delivered in 1904."

At the meeting of the Board of Directors of the United States Steel Corporation, to be held on July 7, dividends for the third quarter will be declared on both the common and preferred. At the same time the earnings of the corporation for the last quarter will be announced. It is stated that they will equal, if not exceed, the earnings for the corresponding quarter last year, but will not be large enough to make up the falling off of $1,500,000 in the net earnings for the first quarter as compared with the first quarter of 1902. For the first half of the year the net earnings are expected to exceed $61,000,000, as compared with about $63,000,000 in the first six months of 1902.

Dividends.—Chicago Pneumatic Tool Company have declared the regular quarterly dividend of 1¾ per cent., payable July 15.

American Car & Foundry Company have declared a quarterly dividend of 1¾ per cent. on the preferred and 1 per cent. on the common stock, both payable August 1. Books close July 10 and reopen August 3.

Pittsburgh Malleable Iron Company of Pittsburgh have declared a regular quarterly dividend of 2½ per cent. and an extra dividend of 2½ per cent., both payable July 10.

Manufacturers' Light & Heat Company of Pittsburgh have declared a quarterly dividend of 1½ per cent., payable July 20.

American Locomotive Company have declared the usual quarterly dividend of 1¾ per cent. on the preferred stock. Payable July 21. Books close July 2 and reopen July 21.

A Proposed Consolidation.—Negotiations are under way looking to the consolidation of the interests of the Marietta Sheet & Tin Plate Company, at Marietta, Ohio, and the Tuscora Steel Company, who have a sheet mill at Newcomerstown, Ohio, but which for the past year has been operated under lease by the Sheet Steel Company, Lewis Block, Pittsburgh. This lease expires on September 15 next and will not be renewed. These two companies, together with the Byesville Steel Company, propose to consolidate, and the latter company will build an open hearth steel plant at Newcomerstown, Ohio, to roll sheet and tin bars for the other two works. The building of the steel plant, however, is dependent upon a bonus of $20,000, together with a certain site of land to be given to the Byesville Steel Company. If these bonuses are granted, work on the open hearth plant will be started at once and the three companies will be consolidated.

The Iron and Metal Trades.

The event of the week has been the strike of the union coal miners in Alabama, the negotiations between the men and the operators, among whom are the leading furnace companies, having failed. The differences are not very serious, but there is the chance that production may be seriously curtailed. The stock of raw material and of Pig Iron is not large, so that a curtailment would be quickly felt, particularly since consumers, too, have been sailing close to the wind.

It is just possible that the strike may precipitate the long delayed buying movement, which naturally would turn first to the producers of other sections not involved.

The stock of Pig Iron on hand in Alabama was less than 65,000 tons on June 1, while the May product was 125,863 tons, so that only a brief stoppage would exhaust the available supply and bring the Foundry Iron market back to the experiences of last winter, since the surplus tonnage during the last two months has really not been large.

As yet it is too early to judge of the effect of a strike extending over more than a few weeks. If extensive banking should result, the weakness which has characterized the markets lately might rapidly disappear and strengthen the situation for the balance of the year. The reports from all the markets, as they deal with the conditions during the past week, must therefore be read with due consideration of the latest events.

The order for 23,000 tons of foreign Foundry Pig Iron for a Western harvester interest has not been placed. In spite of the fact that 99 per cent. of the duty of $4 per ton is refunded in exportation of the finished machines, the figures offered by domestic producers were more favorable. This is an interesting fact as showing that even for export goods, let alone for home consumption, the foreign Pig is out of the market.

An interesting situation has developed in the Western market for Steel Bars. The harvester interest will soon complete its own modern Bar mill, which will not, however, cover all the requirements of the consolidated works. It will, however, take a considerable tonnage out of the market, which is even now suffering from an excessive productive capacity. The modern continuous mills put out an enormous tonnage of Steel Bars, so that only about 60 per cent. of the capacity is utilized. Therefore, there is a sharp contest for the large season orders which the agricultural machinery works are offering, and concessions are being talked of.

In Chicago two Western roads have placed orders for Steel Rails for 1904 with the Colorado mill, the aggregate tonnage being 40,000 tons. Other large business is pending. It is intimated that the domestic mills do not propose to allow any orders to go abroad for next year, and that they propose to meet foreign competition in Canada.

Some good orders have been placed for Structural Steel, but some of the independent bridge shops are not well off for work. The Plate mills are only fairly well employed, but there is some large tonnage in sight for the balance of the year. The Tin Plate mills are exceedingly busy, and the Tube works are under considerable pressure to make deliveries. The Sheet trade is rather slow. Very heavy orders have come to the Hoop mills for the season 1903-1904. Together the combination and the outside mills have taken 40,000 tons.

Pittsburgh reports a heavy tonnage of Sheet and Tin Bars placed the past week for delivery through the remainder of the year.

A Comparison of Prices.

Advances Over the Previous Month in Heavy Type. Declines in Italics.

At date, one week, one month and one year previous.

	June30, 1903.	June24, 1903.	June3, 1903.	July 2, 1902.
PIG IRON:				
Foundry Pig No. 2, Standard, Philadelphia	*$18.50*	$18.75	$19.50	$22.75
Foundry Pig No. 2, Southern, Cincinnati	*17.25*	17.25	18.25	20.75
Foundry Pig No. 2, Local, Chicago	*19.00*	19.00	20.00	....
Bessemer Pig, Pittsburgh	*19.35*	19.35	19.85	21.50
Gray Forge, Pittsburgh	*18.50*	18.50	19.00	21.00
Lake Superior Charcoal, Chicago	24.00	24.00	24.00	24.00
BILLETS, RAILS, &c.:				
Steel Billets, Pittsburgh	*28.50*	28.50	29.00	32.00
Steel Billets, Philadelphia	*30.00*	30.00	31.00	29.50
Steel Billets, Chicago	*29.50*	29.50	31.50	....
Wire Rods, Pittsburgh	*36.00*	36.00	37.00	36.00
Steel Rails, Heavy, Eastern Mill	28.00	28.00	28.00	28.00
OLD MATERIAL:				
O. Steel Rails, Chicago	17.00	17.00	17.00	18.50
O. Steel Rails, Philadelphia	21.00	21.00	21.00	21.00
O. Iron Rails, Chicago	*20.00*	20.00	22.50	24.00
O. Iron Rails, Philadelphia	....	23.00	24.00	25.00
O. Car Wheels, Chicago	*21.50*	21.50	22.00	21.00
O. Car Wheels, Philadelphia	....	21.50	22.50	20.50
Heavy Steel Scrap, Pittsburgh	20.00	20.00	....	....
Heavy Steel Scrap, Chicago	16.50	16.50	16.50	19.00
FINISHED IRON AND STEEL:				
Refined Iron Bars, Philadelphia	*1.75*	1.75	1.85	1.95
Common Iron Bars, Chicago	*1.70*	1.70	1.75	1.75
Common Iron Bars, Pittsburgh	*1.75*	1.75	1.80	1.80
Steel Bars, Tidewater	1.75	1.75	1.75	1.90
Steel Bars, Pittsburgh	1.60	1.60	1.60	1.60
Tank Plates, Tidewater	1.78	1.78	1.80	2.00
Tank Plates, Pittsburgh	1.60	1.60	1.60	1.75
Beams, Tidewater	1.73½	1.73½	1.73½	2.25
Beams, Pittsburgh	1.60	1.60	1.60	1.60
Angles, Tidewater	1.73½	1.73½	1.73½	2.25
Angles, Pittsburgh	1.60	1.60	1.60	1.60
Skelp, Grooved Iron, Pittsburgh	1.90	1.90	1.90	2.15
Skelp, Sheared Iron, Pittsburgh	2.00	2.00	2.00	2.25
Sheets, No. 27, Pittsburgh	2.65	2.65	2.65	2.90
Barb Wire, f.o.b. Pittsburgh	2.60	2.60	2.60	2.90
Wire Nails, f.o.b. Pittsburgh	2.00	2.00	2.00	2.05
Cut Nails, f.o.b. Pittsburgh	2.15	2.15	2.15	2.05
METALS:				
Copper, New York	*14.50*	14.50	14.75	12.12½
Spelter, St. Louis	5.50	5.55	5.50	4.85
Lead, New York	*4.12½*	4.12½	4.37½	4.10
Lead, St. Louis	*4.02½*	3.95	4.15	3.97½
Tin, New York	*28.12½*	28.12½	28.50	28.00
Antimony, Hallett, New York	*6.62½*	6.75	7.00	8.37½
Nickel, New York	40.00	40.00	40.00	50.00
Tin Plate, Domestic, Bessemer, 100 pounds, New York	3.99	3.99	3.99	4.19

Chicago.

FISHER BUILDING, July 1, 1903.—(*By Telegraph.*)

Maneuvering in the Iron and Steel markets during the week has been full of interest, although with the exception of Hoops and Rails negotiations have not led to a large volume of business. Of Hoops, however, a large tonnage has been placed, brought about by keen competition of independent and combination mills. It is generally understood that some concessions have been granted, but just what prices have been made has not as yet been made public. The largest consuming interest of Steel Bars state that they have been offered concessions from the official prices. It has been known for some time that this interest have based their claims for preference upon their large consumption, and the fact that there has been a strong voice in the selling interest favorable to their claims seems to verify the statement that concessions have been offered; and the fact that the harvester interest not only do not resell Bars but are prepared to make a large tonnage of Bars in their own mill, and are thus in a position to dictate terms, gives further foundation for the statement that concessions have been offered. It is believed that within the very near future—possibly within a few days—a heavy tonnage of Bars will be placed by the largest implement manufacturers. The sagging tendency of the Pig Iron market has been more evident during the past week, the belief being general among purchasers that further material concession will be made by furnaces, and evidently this belief is shared in by not a few of the sellers of Iron both North and South. Determined efforts have been made recently by the heaviest consumers in the market to purchase direct from producing interests at from $1 to $1.50 under the "official" level of the

market, and there is reason to believe that these negotiations have been more or less favorable to the melters of Pig. Buying has been confined largely thus far, however, to small quantities for current consumption at or near the established prices, it seeming to be only a question of time when further material concessions will be made by producers. Of Steel Rails about 40,000 tons additional to the sales previously reported have been placed and the consummation of contracts of some tonnage already reported sold. There has been a better inquiry for Billets for prompt shipment, but very few are available in this market and prices are little better than nominal for round lots. In Structural Material, Plates and Sheets there has been but little change and only a moderate degree of activity. Cast Pipe has been especially dull and Merchant Steel has been unusually quiet. Merchant Pipe and Tubes have been moderately active and unchanged. Coke has continued slow and easy, with a further declinging tendency.

Pig Iron.—The feature of interest during the week has been the determined effort of large local consumers to cover requirements for the last half of the year at very much lower prices than have previously been made. It is known that $13 was bid for 20,000 tons or more of No. 2 Southern Foundry and refused, but subsequently a tacit agreement, it is reported, was entered into with another company for 40,000 tons at between $13 and $14 for No. 2, Birmingham basis. Later, however, this offer is said to have been withdrawn, so that again both buyers and sellers are at sea. The general feeling, however, is that the associated Southern furnaces will again make a material cut in the so-called "official" prices within a few weeks. Independent furnaces in the meantime show little respect for the "established" price, offering to sell No. 2 Foundry at $14, Birmingham, for delivery during the last half of the year, with one sale reported of 500 tons of Nos. 2 and 3 Foundry together at $13.50, Birmingham, for delivery during the last half of the year to a point in Missouri. But business during the week has been confined mainly to the purchase of small lots for quick shipment for current requirements, sales being mainly for single cars to 100-ton lots, with a few 500-ton sales, a 1000-ton transaction being rare indeed. There is a very large tonnage awaiting lodgement, however, inquiries for from 2500 up to 3000 tons each being frequent and covering the entire range of buyers in this section. One large furnace interest estimate that they have inquiries for 175,000 tons for the second half of the year, and the belief is general that with the placing of the orders of the agricultural implement manufacturers a general buying movement will ensue. The inquiries cover Bessemer, both Standard and Malleable; Basic Iron Foundry grades, both Strong and Soft; Charcoal and Coke Iron, High Silicon Softeners and special grades. Among the more important sales of a very quiet week have been 500 tons of No. 2 Foundry at $14.50, Birmingham; 500 tons of No. 2 Soft at $14.50, Birmingham; 400 tons of Malleable Bessemer at $19, Milwaukee; 500 tons of Standard Bessemer at $18, Valley furnace; 200 tons of No. 3 Foundry at $14, Birmingham, all for July shipment. The remainder of the transactions have been mainly from single car to 100-ton lots on the basis of quotations. The following are the prices asked, f.o.b. cars Chicago, the inside quotations for the last half of the year and outside for prompt shipment:

Lake Superior Charcoal	$24.00 to $25.00
Local Coke Foundry, No. 1	.... to 20.50
Local Coke Foundry, No. 2	19.00 to 19.50
Local Coke Foundry, No. 3	18.50 to 19.00
Local Scotch, No. 1	21.00 to 22.00
Ohio Strong Softeners, No. 1	21.00 to 21.50
Ohio Strong Softeners, No. 2	20.50 to 21.00
Southern Silvery, according to Silicon	20.60 to 21.50
Southern Coke, No. 1	19.35 to 19.85
Southern Coke, No. 2	18.85 to 19.35
Southern Coke, No. 3	18.35 to 18.85
Southern Coke, No. 1 Soft	19.35 to 19.85
Southern Coke, No. 2 Soft	18.85 to 19.35
Foundry Forge	18.35 to 18.85
Southern Gray Forge	17.85 to 18.35
Southern Mottled	18.10 to 18.35
Southern Charcoal Softeners, according to Silicon	23.85 to 24.85
Alabama and Georgia Car Wheel	27.85 to 28.85
Malleable Bessemer	19.00 to 19.50
Standard Bessemer	19.50 to 20.00
Jackson County and Kentucky Silvery, 6 to 8 per cent. Silicon	23.30 to 24.30

Bars.—The most important feature of the week is the claim made by the largest consumers of Steel Bars that they have been offered concessions from official prices for their season's requirements, which are estimated at from 50,000 to 75,000 tons over and above the capacity of the new Bar mill of the consuming interest. It is recognized that the International Harvester Company are now in a position, to some extent at least, to dictate terms at which they will purchase Soft Steel Bars. It is understood that the present capacity of the new mill is not sufficient to meet the requirements of the constituent companies, but if the issue is forced this capacity can be easily increased. On the other hand, however, with the present price of Billets and the conditions attending the operation of a new mill, it is confidently believed that the implement manufacturers cannot turn out Bars under 2c., temporarily at least. It is readily seen, then, that both sides to the controversy would benefit from a satisfactory settlement of the part deadlock by concessions to the large consuming interest which do not enter the market in competition with other Steel mills. It is reported that negotiations are making, and the result will be the placing of a considerable tonnage of Soft Steel Bars with the combination mills. Business during the week, and, in fact, during the entire month, has been light—that is, as far as new commitments are concerned—but there has been a decided increase in specifying on old contracts. Another important feature of the week has been the placing of a large tonnage of Steel Hoops, it being estimated that independent and combination mills have taken contracts for about 40,000 tons for the 1903-1904 season, the keen competition of the independent mills, it is claimed, being responsible for some concessions, but it is difficult to give exact prices. Bar Iron has continued heavy and weak, business being confined to small lots, as buyers noting a downward tendency are disposed to buy to supply only pressing requirements from day to day. The bulk of the business has been on the basis of 1.70c., Chicago, but desirable tonnage would not be refused under this price, while small lots have sold at 1.75c., base, Chicago. Large contracts are not anticipated before fall. The following are the prices current, f.o.b. cars, Chicago, mill shipment: Bar Iron, 1.70c. to 1.75c.; Soft Steel Bars, 1.76½c. to 1.86½c.; Hoops, 2.16½c. to 2.26½c.; Angles, under 3 inches, 1.86½c. to 1.91½c., base. There has been a moderate consumptive demand in the local jobbing channels, and prices have not changed essentially, being as follows: Bar Iron, 2c. to 2.15c.; Soft Steel Bars, 2c. rates; Angles, under 3 inches, 2.10c. rates, and Hoops, 2.40c., base, from store.

Structural Material.—There has been a slight improvement in the demand for small lots for local consumption, among the most important being about 1500 tons for the Kimbark Building on Wabash avenue, and the contract for the Otis Estate Building on Madison and State streets, which will require about 800 tons, is expected to be placed in the near future. During June local mills have taken contracts for about 8000 tons of railroad bridge work and a moderate tonnage of highway bridge material during the past week. Prices have remained steady, as follows: Beams, Channels and Zees, 15 inches and under, 1.75c. to 1.90c.; 18 inches and over, 1.85c. to 2c.; Angles, 1.75c. to 1.90c. rates; Tees, 1.80c. to 1.90c.; Universal Plates, 2c. to 2.25c. The demand for shipment from local stocks has been only moderate and readily met at previous prices: Beams and Channels, 2¼c. to 2½c.; Angles, 2.25c. to 2.50c.; Tees, 2.30c. to 2.55c., at local yards.

Plates.—The past week has been no exception to the remainder of the month, which has been quiet, the entire sales of the month being but little over 12,000 tons, one-half of which was taken by the local mill, the other going to Eastern producers. It is estimated, however, that the American Shipbuilding Company will need about 30,000 tons for delivery during the last half of the year at lake ports, but just where deliveries will be made will depend upon the outcome of labor difficulties. The market has remained firm in tone, prices being unchanged as previously quoted, f.o.b. cars, Chicago, mill shipment: Tank Steel, ¼-inch and heavier, 1.75c. to 2c.; Flange, 1.85c. to 2.15c.; Marine, 1.95c. to 2.10c. Local stocks are heavy, and the demand for quick shipment is light, but prices are well sustained, as follows: Steel, ½-inch and heavier, 2.15c. to 2.20c.; Tank Steel, 3-16 inch, 2.25c. to 2.30c.; No. 8, 2.30c. to 2.40c.; Flange Steel, 2.40c. to 2.50c., all f.o.b. warehouse, Chicago.

Sheets.—The market has continued very slow for both Black and Galvanized Sheets. Manufacturers recognize that prices will be no higher, even if no reduction is made, and hence nothing is to be gained by early placing of orders. The disposition, therefore, is to purchase only from hand to mouth. The following are the prices current, Chicago, for Black Sheets, carload lots, Chicago, mill shipment: No. 10, 2.12½c. to 2.16½c.; No. 12, 2.22½c. to 2.26½c.; No. 14, 2.32½c. to 2.36½c.; No. 16, 2.42½c. to 2.46½c.; Nos. 18 and 20, 2.56½c. to 2.60½c.; Nos. 22 and 24, 2.66½c. to 2.70½c.; No. 26, 2.76½c. to 2.80½c.; No. 27, 2.86½c. to 2.90½c.; No. 28, 2.96½c. to 3.00½c. There is a moderate demand for shipment from local stocks, which is readily met at 10c. to 15c. over mill prices. Galvanized Sheets have continued dull but steady at 75 and 10, Pittsburgh, and 75 and 5 discount, Chicago, for mill shipment. The light demand for shipment from local stocks is met on the basis of 75 and 2½ to 75 discount.

Cast Pipe.—There has been absence of animation throughout the week, no large contracts having been placed, and even the current demand for renewals by water and gas companies, railroads and mining companies being light, there being a feeling that prices will be lower rather than higher, with the continued downward tendency of Pig Iron. The bids at Erie, Pa., were rejected. There is some little business coming up on the Pacific Coast and some inquiries from railroads in this section, but the prospect for early closing of these contracts is not favorable. Manufacturers continue to sell small quantities at the following

prices, f.o.b. cars, Chicago: 4-inch, $33; 6-inch, $32; 8-inch, $31.50, and larger, $31 for Water, and $1 per ton higher for Gas Pipe.

Billets.—There has been a more active inquiry for both Open Hearth and Bessemer Billets for prompt shipment, but few Billets are available in this section and prices are little better than nominal for rerolling Bessemer at $29.50 and Open Hearth at $29.50 to $30, and single car lots have been sold at $32.50 to $33, according to analysis, buyer and time of delivery, with a premium of $1 to $2 per ton being asked for jobbing lots.

Rods.—There has been a fair demand for Wire Rods, with the sales of 10,000 tons at $36, Pittsburgh, for shipment to a Western point.

Merchant Pipe.—An improvement in trade over the preceding week was experienced, but, as usual during the closing weeks of a month, there has been a further falling off in orders booked, yet this is without significance, the mills being well supplied with orders and a material increase being expected after the first of the month. Prices have remained steady, the following being the schedule of discounts for carload lots, Chicago, base, random lengths, mill shipments:

	Steel Pipe.		Guaranteed Wrought Iron.	
	Black. Per cent.	Galvd. Per cent.	Black. Per cent.	Galvd. Per cent.
⅛ to ⅜ inch	66.35	56.35	63.35	53.35
½ inch	68.35	58.35	65.35	55.35
¾ to 6 inches	73.35	63.35	70.35	60.35
7 to 12 inches	67.35	57.35	64.35	54.35

Less than carloads, 12½ per cent. advance.

Boiler Tubes.—No change of importance has been noted in the market during the week, there being a fair volume of business, and prices have remained steady at the following schedule of discounts:

	Steel.	Iron.
1 to 1½ inches	43.35	38.35
1¾ to 2½ inches	55.85	35.85
2¾ to 5 inches	60.85	45.85
6 inches and larger	55.85	35.85

Less than carloads, 12½ per cent. advance.

Jobbers have continued to experience a fair demand, some reporting larger shipments than for many weeks. The market has remained steady at the following schedule of discounts from local warehouse:

	Steel.	Iron.
1 to 1½ inches	40	35
1¾ to 2½ inches	50	32½
2¾ to 5 inches	57½	42½
6 inches and larger	50	..

Merchant Steel.—Less activity has been noted in Machinery, Tire and Spring Steel than for some time, but there has been a good inquiry for Crucible Tool Steel. The market for all kinds has remained steady, the following being the quotations for mill shipment, f.o.b. cars, Chicago: Smooth Finished Machinery Steel, 2.01½c. to 2.11½c.; Smooth Finished Tire, 1.96½c. to 2.11½c.; Open Hearth Spring Steel, 2.66½c. to 2.76½c.; Toe Calk, 2.31½c. to 2.46½c.; Sleigh Shoe, 1.86½c. to 1.96½c.; Cutter Shoe, 2.41½c. to 2.61½c. Ordinary grades of Crucible Tool Steel are quoted at 6c. to 8c. for mill shipment; Specials, 12c. upward. Cold Rolled Shafting in carload lots sells at 47 and in less than carload lots at 42 discount from list.

Rails and Track Supplies.—There is still considerable activity in the Rail market, but much of the last week has been devoted to closing up of contracts already reported. Among the more important transactions reported during the week have been 20,000 tons for the Denver & Rio Grande and 20,000 tons for the Missouri Pacific, placed with the Colorado Fuel & Iron Company. The Santa Fé and 'Frisco lines are said to be negotiating for their 1904 requirements, but have not yet placed contracts, and the Chicago, Milwaukee & St. Paul contract has not been closed. The 90,000 tons for the Central and Southern Pacific lines are said to be still under negotiation, although it is claimed that this tonnage has been placed with the Colorado Works. It is also reported that the Rock Island will place some tonnage with the Denver mill for its Western branches. One lot of 2500 tons and one lot of 1000 tons have been placed by small roads in the Northwest for delivery during 1904, and one lot of 3100 tons for delivery during the last quarter of this year. There has continued to be a good demand for Light Rails. Official prices, of course, remain unchanged at $28 for standard and $27 for second quality, mill shipment. Light Sections are selling at $34 to $40, according to weight. Track Supplies have continued active and the market has remained at the following prices for mill shipment, Chicago: Splice or Angle Bars, 2c. to 2.10c.; Spikes, 2.10c. to 2.15c.; Track Bolts, 3½ to 3¾ inches and larger, with Square Nuts, 2.85c. to 2.90c.; with Hexagon Nuts, 3c. to 3.10c. From store, 10c. to 15c. over mill prices are asked and obtained.

Old Material.—There has been less pressure to sell and receipts have been smaller, with prices better sustained; but at the same time there has not been much demand, as both dealers and mills seem to be well supplied, temporarily at least. Prices have remained without essential change, the following being the prices current per gross ton, f.o.b. cars Chicago:

Old Iron Rails	$20.00 to $20.50
Old Steel Rails, mixed lengths	17.00 to 17.50
Old Steel Rails, long lengths	19.50 to 20.00
Heavy Relaying Rails	31.00 to 31.50
Old Car Wheels	21.50 to 22.00
Heavy Melting Steel Scrap	16.50 to 17.00
Mixed Steel	14.50 to 15.00

The following quotations are per net ton:

Iron Fish Plates	$17.00 to $17.50
Iron Car Axles	21.00 to 22.00
Steel Car Axles	20.00 to 21.00
No. 1 Railroad Wrought	15.00 to 16.00
No. 2 Railroad Wrought	14.00 to 14.50
Shafting	17.00 to 18.00
No. 1 Dealers' Forge	13.00 to 14.00
No. 1 Busheling and Wrought Pipe	12.50 to 13.00
Iron Axle Turnings	12.00 to 12.50
Soft Steel Axle Turnings	12.00 to 12.50
Machine Shop Turnings	12.00 to 12.50
Cast Borings	7.00 to 7.50
Mixed Borings, &c	8.00 to 9.00
No. 1 Boilers, cut	.... to 13.00
Heavy Cast Scrap	14.00 to 14.50
Stove Plate and Light Cast Scrap	.... to 10.00
Railroad Malleable	15.00 to 15.50
Agricultural Malleable	.... to 14.00

Metals.—A weaker tone has prevailed for Copper, and although there has been some little increase in business, it has been at the expense of prices. Casting Copper has been sold at 13¾c., and Lake at 14¼c., Chicago, in carload lots. A weaker feeling has been developed in Spelter in sympathy with other points, the local market being easier at 5.50c. to 5.55c. in carload lots for August shipment. Sheet Zinc is scarce and nominal. There is a fair movement in Pig Lead, but prices in this market are only nominal at 4.05c. in 50-ton lots and 4.07½c. in carload lots. Old Metals have been slow and easier in sympathy with new material. Heavy Cut Copper sells at 11¾c., Red Brass at 10⅞c., Copper Bottoms at 10⅝c., Lead Pipe at 3.75c., and Zinc, 4.65c., spot.

Coke.—The market has continued dull and heavy under freer offerings, both spot and to arrive. Ovens have made better terms for Furnace Coke for delivery during the last half of the year. There is a fair inquiry and some business of moment on the basis of quotations. Furnace Coke is offered at $2.50 to $3 and Standard Foundry Coke at $3.50 to $4 at the ovens. Sales of single car lots of Furnace Coke have been made at $4.65 to $5.15 and Foundry Coke at $5.50 to $6, spot track, Chicago.

Philadelphia.

FORREST BUILDING, June 30, 1903.

The closing of the first half of the year is in marked contract with that of the corresponding period of 1902. Prices were then strong, and buyers clamoring for Iron in enormous quantities, while to-day they act as though they were going out of business, and merely want odd lots to piece out with. The year began with No. 2 X Foundry at $23, but there has been a gradual decline during the entire six months. The average loss has not been more than $4 per ton, which, in view of the abnormally high figures to which Pig Iron had risen, is not a very serious decline. Coal and Coke are cheaper, and while to-day's prices for Iron are not far from cost to some makers, they would have been considered magnificent figures five or six years ago. Further declines (which are not improbable) must therefore be met by retrenchment at some point, but where it will be and to what extent, is an unsolved problem. The demand for Iron during the past three months has been extremely disappointing, but on the other hand, consumption is enormous, and that stocks have been kept within narrow limits must not be overlooked. A consumption approximating to 400,000 tons per week, including foreign Iron, is surely no indication of unfavorable conditions. The tendency, however, is to look to the coming six months rather than to that which is passed. This may be wise, or it may be otherwise, but it must be conceded that there is a disposition to believe that a period of retrenchment and readjustment must be dealt with in the near future, and which, in fact, is now in progress. This idea arises in part from the increased capacity for production, in part from the belief that the railway interests have nearly completed their renewals as well as their purchases of new equipment, and in part from the belief that continued high pressure in business activity would lead (and has led) to demands from labor which it would be impossible to meet. It is the general opinion that the reaction which is now in progress is largely due to the exorbitant demands from this source, and the point has been reached at which capital would sooner withdraw then take a position which might involve further contests in regard to wages. In a lesser degree the money market and the status of certain large industrial plants has caused some distrust. The most important factor, however, is the crop situation. On the whole, the outlook is said to be favorable; the wheat crop is considered as assured, the corn crop is late, but there is time enough for planting a large area. The danger is in its being late, and thereby being more liable to frost. This, of course, may seem to be rather far fetched, but until there is something approaching to certainty in regard to the points

named, business will be more or less restricted. The market therefore is like the corn crop—it has to be made during the next two or three months, but until the process is completed it would be unsafe to say what its character will be. Meanwhile, however, July should develop a good deal more activity than during the two or three months immediately preceding.

Pig Iron.—Business during the entire half year has been somewhat sluggish, but prices were pretty well maintained during the first quarter. The year opened with No. 2 X Foundry at $23, lost about 50c. during January and 25c. more during February. Business became very dull during March and April, and during the latter month there was a perceptible weakening, and early in May $21 to $21.50 was quoted for almost any quantity and any delivery, and before the close of the month there was plenty of Iron at $20. Weakness developed more rapidly during June, and although $19 to $19.50 is still quoted for some Irons, there is no trouble in finding other good brands at $18.75 to $19. As yet there is no demand for large lots, and it is believed that $18 to $18.50 will have to be quoted before buyers take hold for extended deliveries or large quantities. This, of course, is merely an opinion, as bids of that character have not been made yet, but there is good reason for saying that there is a strong probability that something will be done at pretty close to that basis within the next two or three weeks. A decline such as there has been during the past six months is a discouraging feature, but the volume of business has been the largest on record, and a slowing down for a readjustment is quite natural. The reasons for this and the probabilities in regard to the future have already been considered, so that further comment is unnecessary at this time. Prices are too irregular to be quoted with strict accuracy, but a fair average for deliveries in Philadelphia and nearby points would range about as follows:

No. 2 X Foundry	$18.50 to $19.00
No. 2 Plain	17.75 to 18.25
Gray Forge, Standard	18.00 to 18.25
Ordinary Gray Forge	17.25 to 17.50
Basic	18.50 to 18.75

Steel.—Prices have not varied to any great extent during the past six months. A great deal of German and Canadian Steel has been imported at prices varying from $26.50 to about $30, ex-ship duty paid. The output of our own mills has been largely increased, however, so that imports hereafter are not likely to be important—if any at all. The new mills of the Alan Wood Iron & Steel Company, the enlarged plant of the Lukens Iron & Steel Company, the Diamond Steel Company and others, are in a condition to supply the local trade, so that unless something unforeseen occurs imports are an extreme improbability. Prices began in January at about $27.50 for foreign, and during the first quarter a large business was done, owing to the lower cost as compared with American, prices varying from $26.50 to $29 on dock, duty paid, according to quantity. Western Steel was steady during the first five months, but not active at $31.50 to $32.50 for ordinary Steel, as against $30 to $31 at the present time. Local Steel is quoted at about $30, delivered, and will no doubt be used in preference to foreign or Western Steel.

Finished Material.—Prices average about $5 per ton lower than during the first month of the year, and at the decline the feeling is not specially hopeful of an immediate recovery. Plates are firmer than anything else, but even they no longer command a premium, indicating that there is no difficulty in securing prompt deliveries. The same remarks apply to Structural Material, which is held at firm prices, but no premiums are required, whereas a year ago ½c. a lb. or more was the rule for guaranteed deliveries during the greater portion of the summer and fall months. Bar Iron is in about the most unsatisfactory condition of any of these interests, as there is no uniformity, owing to the abandonment of the pooling arrangement. Prospects are not encouraging, but with a more or less extended suspension of work during the coming month, things may be in better shape when the mills start up after the holidays.

Cincinnati.

FIFTH AND MAIN STS., July 1, 1903.—(*By Telegraph.*)

The situation in Pig Iron, especially in so far as the Southern article is concerned, seems just a bit chaotic. Actual selling has been very limited, and at prices which range closely around the standards of a week ago. There have been a number of rumors regarding the actions of nearly all the leading factors on the selling side. These rumors are generally in effect that the "other fellow" was premeditating a cut to $12, Birmingham, for No. 2, to take effect July 1. These reports are emphatically denied by each in turn, and were indicative of some general apprehension or expectation they would not be mentioned here. Sellers seem to regard some lower basis inevitable, and in some instances agents are said to have advised buyers to wait a week or two before contracting. In view of these conditions it seems perfectly natural for buyers to be restricting their purchases to the most absolute daily needs. Northern Irons are in the same general class as to dullness of trade, and they are also quotably 50c. lower. It is understood that the Southern Association is to hold a meeting within the next few days, and there is a disposition to wait for developments. Freight rates from the Hanging Rock district, $1.15, and from Birmingham to Ohio River points, $3.25. We quote, f.o.b. Cincinnati, for delivery throughout the year, as follows:

Southern Coke, No. 1	$17.75 to $18.75
Southern Coke, No. 2	17.25 to 18.25
Southern Coke, No. 3	16.75 to 17.75
Southern Coke, No. 4	16.25 to 17.25
Southern Coke, No. 1 Soft	17.75 to 18.75
Southern Coke, No. 2 Soft	17.25 to 18.25
Southern Coke, Gray Forge	15.25 to 17.00
Southern Coke, Mottled	15.25 to 17.00
Ohio Silvery, No. 1	24.15 to 24.65
Lake Superior Coke, No. 1	18.15 to 18.65
Lake Superior Coke, No. 2	17.65 to 18.15
Lake Superior Coke, No. 3	17.15 to 17.65
Car Wheel and Malleable Irons.	
Standard Southern Car Wheel	$26.75 to $27.00
Lake Superior Car Wheel and Malleable	24.75 to 25.25

Plates and Bars.—We quote, f.o.b. Cincinnati: Iron Bars, in carload lots with half extras, 1.75c.; same, in small lots with full extras, 2.20c.; Steel Bars, in carload lots with half extras, 1.75c.; same, in small lots with full extras, 2c.; Base Angles, 1.70c.; Plates, ¼-inch, 1.70c.; Beams and Channels, 1.70c.

Old Material.—We quote dealers' buying prices as follows, f.o.b. Cincinnati: No. 1 Wrought Railroad Scrap, $15.50 per net ton; Iron Axles, $23.50 per net ton; Cast Scrap, $14, gross; Iron Rails, $22, gross; Long Steel Rails, $18, gross; Car Wheels, $21, gross; Low Phosphorus Steel, $22, gross; Heavy Melting Steel, $17.50, gross.

Cleveland.

CLEVELAND, OHIO, June 30, 1903.

Iron Ore.—Lake shipments are being seriously curtailed by the shortage of cars in the lower Lake regions. The Coal trade to the lakes has been blocking the receiving yards, and thus shortening the supply of cars in the Ore trade. The disease is organic, and the only possible remedy will be to bring the cars empty from the furnaces to the Ore docks, a thing which the railroads are not disposed to do. The delays all around have shortened the supply of vessels, and it does not always meet the needs. Relief sometimes comes from the influx to the Ore trade of boats customarily trading in lumber, but the relief is hardly appreciable. The Ore movement is therefore lighter than had been expected earlier in the year. The rates are strong with upward tendencies, but without a change, being 80c. from Duluth, 70c. from Marquette and 60c. from Escanaba, all at Ohio ports. Very little is being done in Ore sales, although there is some talk of further transactions. The prices hold at $4.50 for Bessemer Old Range, and $4 for Bessemer Mesaba as a basis for all grades.

Pig Iron.—The trading in Bessemer Pig Iron is reduced to the minimum. There have been some small inquiries for fourth quarter delivery from outside consumers, but they have not been of moment. Prices have not changed, ranging between $18.50 to $19.35, in the Valleys. The Basic producers are still out of the market. Many of the stacks in this immediate territory have not yet caught up on their back orders, and will be kept busy for some time filling the old contracts. The price is nominally $18.75, in the Valley, for third quarter delivery. The Foundry Pig Iron situation does not vary greatly from the conditions previously outlined. During the past week some of the Southern furnaces have been trying to sell in this market at the association price, but have found that $15, Birmingham, is too high to attract consumers. The non-association furnaces of the South have been selling in this territory at $14.50, Birmingham. Northern furnaces have been doing but little business for the second half. Many of the stacks have been turning out Malleable Iron, and have been finding a steady market for it. Furnacemen believe that second half prices will range, when fixed, from $19 to $19.50, Valley furnace, for No. 2. The production in the Valleys has been very heavy, and the shipments have been satisfactory, little difficulty being experienced in that direction. The supply of Coke has been sufficient, but under difficulties, the producers finding it necessary to keep urging shipments constantly.

Finished Iron and Steel.—During the past ten days the situation in the Plate trade has improved greatly. The demand has been brisk, and while the amounts have been small the aggregate tonnage is large. There has also been a great improvement in specifications against old contracts, and a decided change has been made in the possibility of obtaining delivery. Last week deliveries were possible in ten days to two weeks, and now the larger mills are not offering shipment inside of three or four weeks. Smaller producers are still struggling to get premium business. Some of them are holding for 2c., Cleveland, while others are making contracts, on choice specifications, at 1.80c., with some demanding 1.85c. to 1.90c. for general specifications. Light Plates, 3-16 and smaller, are harder to obtain than the larger gauges. The demand for Structural Steel has likewise improved, and the specifications are heavier, but the

delivery schedules have not been changed in any respect. The demand has been on those sizes which have been the more plentiful, and on which the market has been weaker. Deliveries, therefore, range from two weeks to three months, according to the size desired, Small Angles and Large Beams obtaining practically immediate shipment. The jobbers are getting a little business, as the demands for that material out of stock have improved with the better conditions generally prevailing. Stock prices have held at 2.15c. to 2.25c. Bars are still in fair demand, as to the Steel product, with Iron getting weaker. The big consumers have not covered their needs for any time in the future, but are buying hand to mouth. The smaller consumers are still covering for the half year only. Competition has been met by some of the larger mills on the basis of 1.70c., Cleveland, for Bar Iron, but it would be difficult to say whether this represents the market or not. Many of the Bar mills in this territory will go out of service on July 3, and will remain idle for the remainder of the month. This is expected to affect the price of the Iron product later in the year. Steel prices have not changed from 1.60c., Pittsburgh, for Bessemer, and 1.70c. for Open Hearth. The Sheet trade has been running about on an even keel with a moderate amount of business at unchanged prices. We quote Black Sheets out of stock based on No. 27, 3.05c.; in carload lots at the mill for No. 14 blue annealed, 2.20c., and for No. 27 one pass cold rolled, 2.75c. Galvanized Sheets are based on No. 27 at 4c. out of stock. The inquiries on Rails have been brisk, and the trade is strong. This territory presents mostly electric line business in which the interest is unabating. The association price of $28 prevails. In Bessemer Billets no trading is reported during the week.

Old Material.—No transactions are reported, except between dealers. The quotations are nominal, all gross tons: Heavy Melting Steel, $19.50; Old Steel Rails, $20.50; Old Iron Rails, $24 to $25; Car Wheels, $21; Railroad Malleable, $17; Cast Borings, $12. All net tons: No. 1 Railroad Wrought, $19.50; No. 1 Busheling, $16.50; Wrought Turnings, $13; Iron Axles, $26; Cast Scrap, $16.50; Stove Plate, $12.50.

Pittsburgh.

PARK BUILDING, July 1, 1903.—(*By Telegraph.*)

Pig Iron.—We can report a distinctly better feeling in the Pig Iron market. While sales continue to be confined mostly to small lots, there is an improved inquiry and no large lots of Iron are pressing on the market. Sales of Bessemer and Basic Iron in June were about 50,000 tons, a good part of which was taken by the United States Steel Corporation and the Republic Iron & Steel Company. The furnaces belonging to the Bessemer Furnace Association are practically out of the market as sellers of Iron for the third quarter, and any Bessemer Iron that is being offered below $18.50 at Valley furnace is by brokers or furnaces outside the two valleys. Forge Iron continues quiet, Northern brands being held at about $18.75 to $19, while Northern brands of No. 2 Foundry are held at $19.75 to $20, Pittsburgh. We are advised that the official prices of Southern Forge and Foundry are being rigidly held, but for Pittsburgh delivery lower prices are named by a few furnaces who have lower rates to Pittsburgh than the Southern furnaces.

Steel.—We note the fact that very heavy tonnage of Sheet and Tin Bars has been booked by several of the leading Steel interests for delivery over the third quarter, and also over the last half of the year. Bessemer Sheet Bars are held at $30, and Open Hearth about $31, maker's mill, for reasonably prompt delivery. For July and August shipment Bessemer Sheet Bars have sold in small lots at about $31, and Open Hearth $32, maker's mill. Bessemer Billets are held at $28 to $28.50, and Open Hearth about $29 to $29.50, f.o.b. maker's mill. Some mills that have little Steel to spare quote higher prices than these.

Steel Rails.—Already there have been booked for 1904 delivery over 500,000 tons of Rails, of which more than two-thirds has been placed by Western roads and the balance by Pennsylvania and smaller roads. The mills will carry over into next year a large tonnage from this year. We quote at $28, at mill, for Standard Sections in 500-ton lots and over.

(*By Mail.*)

Important conferences are being held between committees from the Machinists' Union and the large machine shops in this district, and there is a prospect that the threatened strike of the machinists to be started on July 1 may be averted. It is understood that concessions have been made by both sides and they are nearer together than at any time since the conferences started more than a month ago. Should this threatened trouble be fixed up without a strike it will be a splendid thing for the Iron trade, for if the machinists go out it will not only cripple the machine shops themselves but the larger Steel interests who have their own machine shops and whose men will go out on strike. There is also a possibility that the molders' strike may be settled before long, and in a general way the labor situation may be said to be more encouraging than for some time. The boiler makers are still out, with no immediate prospects of this trouble being arranged. An encouraging feature of the situation in the Iron trade is that large consumers of Pig Iron, such as Carnegie Steel Company and others, who buy from the outside furnaces are pressing the makers for prompt deliveries, thus showing that the Iron bought is going into actual consumption. There is a better inquiry for Pig Iron, and while no large lots have been placed consumers are taking more interest in the market and are expected to place some business before very long. Some attractive prices are being made on Bessemer Iron for shipment over last six months, but so far these have failed to land any large tonnage. Bessemer Iron is nominally $18.50 at furnace, but there is no doubt that on a large tonnage for delivery over third quarter or second half of the year this price would be materially shaded. The situation in the Steel market is somewhat peculiar. Prices of Bessemer Billets are about $28.50 at maker's mill, but Sheet Bars are held at about $31 and Tin Bars at about $32, maker's mill. This wide spread between prices of Billets and Sheet and Tin Bars represents the cost to the small mills for rolling Billets into Bars, and which the larger mills, whose cost is very much lower, evidently intend to absorb. In Finished Iron and Steel the market is without special change. A moderate amount of tonnage is being placed in Plates, Sheets, Structural Steel and Bars, but in Tin Plate and Pipe demand is extraordinarily heavy and the mills are filled up for several months ahead. Taken as a whole, the local situation in the Iron trade is showing a better feeling, and it is believed that tonnage in July will show a material improvement over the month just closing.

Plates.—Some fair sized orders for Plates have been placed since our last report, the Steel car concerns having given out considerable tonnage for delivery in third quarter. The larger mills are well sold up for the next several months, but at the same time other mills are not so well fixed and prompt deliveries of Plates can easily be obtained. Premiums in prices are no longer paid and we quote: Tank Plate, ¼-inch thick and up to 100 inches in width, 1.60c., at mill, Pittsburgh; Flange and Boiler Steel, 1.70c.; Marine, Ordinary Fire Box, American Boiler Manufacturers' Association specifications, 1.80c.; Still Bottom Steel, 1.90c.; Locomotive Fire Box, not less than 2.10c., and it ranges in price up to 3c. Plates more than 100 inches wide, 5c. extra per 100 lbs. Plates 3-16 inch in thickness, $2 extra; gauges Nos. 7 and 8, $3 extra; No. 9, $5 extra. These quotations are based on carload lots, with 5c. extra for less than carload lots; terms net cash in 30 days.

Ferromanganese.—The market continues extremely quiet and sellers of Steel quote $50, delivered, for 80 per cent. Ferro. On a firm offer and good sized tonnage it is probable that this price could be shaded.

Muck Bar.—The market continues very dull and we quote best grades of Muck Bar at $32.50, delivered, in the Pittsburgh district. Possibly a lower price might be made on a firm offer.

Structural Material.—Some good sized inquiries are in the market, and if present labor complications are cleared up it is certain that a good deal of tonnage will be placed in the near future. In spite of adverse conditions the tonnage of American Bridge Company in June was extraordinarily heavy, and the outlook is that the Structural concerns will have all the business this year that they can handle. There have been no large contracts recently placed in this district. Prices are as follows: Beams and Channels up to 15-inch, 1.60c.; over 15-inch, 1.70c.; Angles, 3 x 2 up to 6 x 6, 1.60c.; Zees, 1.60c.; Tees, 1.60c.; Steel Bars, 1.60c., half extras at mill; Universal and Sheared Plates, 1.60c. to 1.70c.

Sheets.—The Sheet trade is in fairly satisfactory condition, and some of the mills report a little better inquiry for Black Sheets. The strikes in the building trades together with the floods have mitigated against demand, but it is probable that these occurrences will create a new tonnage in Sheets before long, and will give the mills a good deal of work, in what is usually a dull season. Prices are fairly well maintained, our quotations on Black Sheets being slightly shaded only in a few isolated cases. Nos. 22 and 24, Box Annealed, one pass through cold rolls, 2.45c.; No. 26, 2.55c.; No. 27, 2.65c. to 2.75c., and No. 28, 2.75c. to 2.85c. We quote Galvanized Sheets at 75 and 10 to 75, 10 and 2½ off in carload and larger lots.

Hoops and Bands.—There is nothing of special interest to note. A moderate tonnage is being placed in Hoops and Bands, but the Cotton Tie season is over. We quote: Cotton Ties, 86½c. per lb. per 10,000 bundle lots or over; 91½c. for carloads; Steel Hoops, 1.90c. on 250-ton lots and 2c. for carloads; Bessemer Bands, 1.60c. for Bessemer Stock and 1.70c. for Open Hearth. Extras as per Steel card.

Rods.—We do not hear of any large lots being placed. A mill in the far West is figuring on the purchase of 2000 tons. Bessemer Rods are held at about $36 and Open Hearth

$37, maker's mill. Probably on a firm offer and for a round tonnage these prices would be shaded.

Iron and Steel Bars.—Specifications on old contracts for Steel Bars are coming in at a more satisfactory rate than for some time, and the amount of new tonnage being placed is said to be slightly larger. There is a fair demand for Iron Bars, and mills report specifications on contracts as coming in quite freely. On Common Iron Bars the market is about 1.75c., Pittsburgh, half extras, but it is probable that on a desirable specification some of the mills that are actively seeking tonnage would shade this price. We quote Steel Bars at 1.60c., at mill. All specifications for less than 2000 lbs. of a size subject to the following differential extras: Quantities less than 2000 lbs., but not less than 1000 lbs., 0.10c. per lb. extra; quantities less than 1000 lbs., 0.30c. per lb. extra, the total weight of a size to determine the extra regardless of length.

Tin Plate.—Demand for Tin Plate continues active, and we have advices that 10,000 boxes or more of Bright Plate have been booked by outside mills in the past week at prices ranging from $3.90 to $4 a box, f.o.b. Pittsburgh. While the fruit crop this year will be late, yet it promises to be very large, and for this reason the canning trade are expected to be heavy consumers of Plate along in August and September, and the same is true of the salmon and sardine packers. There have been reports of an advance in prices of Cokes about July 1, but these have not been verified.

Merchant Steel.—The market generally is quiet and without special feature. Some fair sized contracts for Spring Steel have been placed, and users of Tool Steel are in the market with some fair sized inquiries. Shafting continues quiet, but prices are reasonably firm. We quote Smooth Finished Tire Steel at 1.80c. to 1.85c; Open Hearth Spring, 2.40c. to 2.50c.; Sleigh Shoe, 1.70c. to 1.75c.; Tool Steels, 6½c. to 10c. for ordinary grades; Cold Rolled Shafting is 42 per cent. off in less than carloads and 47 per cent. in carloads, delivered in base territory.

Iron and Steel Skelp.—The market is extremely quiet, and while a good deal of Skelp is being offered we do not hear of any large sales. We quote Grooved Iron and Steel Skelp at 1.90c. and Sheared at 2c., Pittsburgh. On a desirable specification these prices would be shaded.

Pipes and Tubes.—Demand for Pipe continues abnormally heavy and the mills are filled up for the next two or three months, and on the larger sizes, 10 inch and upward, for a still longer period. Inquiries are in the market for 12 miles of 10-inch, 12 miles of 12-inch and 32 miles of 12-inch. Prices are very firm, discounts to consumers in carloads being as follows:

Merchant Pipe.

	Steel.		Wrought Iron.	
	Black.	Galv.	Black.	Galv.
	Per cent.	Per cent.	Per cent.	Per cent.
⅛, ¼ and ⅜ inch	68	58	65	55
½ inch	70	60	67	57
¾ to 6 inches	75	65	72	62
7 to 12 inches	69	59	66	56

Merchant Boiler Tubes.

	Steel.	Iron.
1 to 1½ inches	42½	39
1¾ to 2½ inches	55½	38
2¾ to 5 inches	61	48
6 to 13 inches	55½	38

Iron and Steel Scrap.—There is very little doing in Scrap, consumers deferring purchases until after the usual shut down on July 1 for repairs and inventory. Prices on nearly all kinds of Scrap have gone off to some extent. We quote Heavy Melting Stock at $20.50 in gross tons and note a sale of 5000 tons of choice stock at that price. It is probable that on large tonnage and for delivery over second half of the year $20 could be done. Strictly No. 1 Railroad Wrought Scrap is $19 to $19.50 in net tons; Old Car Wheels are $21.50 to $22, gross tons; Cast Scrap is $18 to $19, gross tons; Iron Rails are very dull, but are held at about $24.50 in gross tons; Rerolling Steel Rails are $22 to $23 in gross tons.

Coke.—Consumers of Blast Furnace and Foundry Coke are still holding off placing contracts for last half of the year's delivery, believing that prices may be still lower. While a few contracts for strictly Connellsville Furnace Coke have been placed at $2.75 a ton at oven, yet it is being freely offered somewhat under this price. Seventy-two-hour Foundry Coke is being offered on contracts for last six months at $3.25 to $3.50 a ton at oven, but consumers refuse to come in and place contracts at these figures. There is a surplus of Coke, which is responsible for the low prices at which it is being offered. Output last week in the Upper and Lower Connellsville region was about 295,000 tons.

The Ramapo Iron Works of Hillburn, Rockland County, N. Y., and the MacPherson Frog & Switch Company have consolidated under the name of the former company. The capital stock of the merger is $1,400,000, and the main office will be located at Hillburn. The directors are W. W. Snow, F. W. Snow and R. J. Davidson of Hillburn, W. B. Rankine of Niagara Falls and J. M. Van Winkle of Bloomfield.

Birmingham.

BIRMINGHAM, ALA., June 29, 1903.

There has been no change in the Iron market since last letter. Sales have been light, but inquiry is somewhat improved. It looks as though some buyers were getting on the anxious seat as to supplies and are frequent feelers of the market. No large interests are concluding any transactions. Business is confined to the small consumers and every order bears the tag, "Ship at once. We are out of stock." Information from various sources tends to confirm the assertion that stock in melters' hands is at a low ebb, and more activity in replenishing deficiencies than has prevailed was anticipated. Buying is yet confined to the nearby deliveries. Some selling agencies in buying markets think that they see evidences of an improved feeling among the buyers, and encourage sellers in the hope that the buying fever is soon to strike the market. We have just passed the dullest month in the year, when but a small business could be expected; but if in July there is not more activity in the market lower prices must result. There is some accumulation of Iron, and it is being added to every week; but it is not of heavy volume and a short lived activity would clean it up. The combination prices are still being quoted by the associated furnaces, and there can be no doubt that they are being maintained; but the outside furnaces are looking for business and taking it around $14 for No. 2 Foundry. It is true that the sales of the associated furnaces, in number and in volume, largely exceed the independent interests; but the effect of one sale at material concessions permeates the market quickly and hesitation becomes refusal. Some Iron was worked on the basis of $13 for No. 2 Foundry, some at $15 and some at $14.50, but at the inside prices the volume of business was more restricted than at association prices. The next two weeks will be regarded anxiously, for they will indicate the course of prices and the demand that will follow. The miners' convention has absorbed public attention more than the Iron market. There has been a good deal of sparring between the operators and the miners, and nothing practical has so far been accomplished. An offer to the miners of a 2½-cent increase in the price of mining Coal was unanimously declined and a counter proposition of 5 cents was made, to which was added an increase for day labor, an eight-hour day and a semimonthly pay day. These were in turn rejected by the operators and—"there you are." The chances are the wrangling will be of some duration, to the material injury of the district. Great good humor has characterized the convention so far, and it is gratifying to note an entire absence of any bitterness. Both sides are firm in assertions that they will not recede from positions assumed, and it is hard to say on what basis differences will be compromised. It can only be said that the expectation now is that the suspension of work will be for a short time only. In anticipation of possible trouble the railroads and other interests have been laying in Coal supplies for some time, so they are prepared for a shut down.

The Steel mill is now steadily running on Rails and will gradually increase output. They are using in the operations of the mill the Basic Iron output from four furnaces, which withdraws that grade from the market. It is rumored that sales of Steel Rails have been made at $30 here, but it cannot as yet be confirmed. The rolling mills and foundries seem to have been hard pushed to keep in sight of orders and have of late been doing record work. There are enough local interests here now to keep things moving all the time in most of our shops. Outside territory is being constantly and successfully invaded for business, and we are ever enlarging and expanding.

It is current rumor that 300 Coke ovens will be erected at Woodward to supply the new furnace, while the Flat Top ovens of the Sloss-Sheffield Company are now complete, rendering the latter company independent of outside sources of supply. Others are gradually getting in the same fix, and it is asserted that before the end of the year this district will be independent and enabled to supply its own needs. The railroad from here to Huntsville is being agitated and arouses much interest. At a meeting of representative men from the section to be traversed it was decided to arrange for a preliminary survey and to push things to tangibility. In due time we will have the road.

(By Telegraph.)

BIRMINGHAM, ALA., June 30, 1903.—The Coal Operators and the United Mine Workers' organization adjourned this afternoon without coming to an agreement upon the scale of wages for the coming year. The operators offered an advance of 2½c. per ton minimum and maximum for mining Coal, day wages and dead work to participate in the increase. The miners accepted that offer, with the provision added that their demands for 2½c. additional, an eight-hour day and a semi-monthly pay day be submitted to arbitration.

The latter propositions were refused, and the convention adjourned subject to the call of the chairman. The strike, therefore, is practically on, and any statement as to its duration is simply a matter of speculation. Some interests anticipating the present condition have provided against it by stocking up with Coke and Coal, and are prepared to stand the siege. It is the general belief that the strike will be of short duration, but that is a case where the wish is father to the thought. No one can speak with any authority as to that. Every day that the strike lasts means, in the aggregate, the loss of a fortune to the mining fraternity. Railroads and furnace interests have been heaping up supplies to guard against this contingency, and the action of the miners will not catch them napping. The outcome should result in the strengthening of the Iron market, for production must be more or less affected. Technically speaking, no strike has been declared, but the old scale expired to-day, and until a new one is agreed upon all labor will cease at the mines. This practically inaugurates a strike to enforce miners' demands which operators will never grant.

German Iron Market.

ESSEN, June 16, 1903.

Since our last report there has been very little change in the general condition of the German Iron and Steel market. Since the principal requirements for Pig Iron, Steel and the coarser rolling mill products have been covered weeks ago up to October 1 the market has grown more quiet. The works, generally speaking, are very well employed, and the production is larger than ever before. Thus the production of Pig Iron during the first four months of 1903 was 3,184,419 tons, as compared with 2,608,283 tons in the corresponding period of 1902. The exports still call for a large percentage of the product, the entire shipments of Iron and Steel during the four first months of this year having been 1,221,217 tons, as compared with 968,210 tons in the corresponding period of 1902, and 617,794 tons in the corresponding period of 1901.

The principal items in the exports during the first four months of the last three years are shown in the accompanying table:

German Exports.

	First four months,		
	1903. Metric tons.	1902. Metric tons.	1901. Metric tons.
Pig Iron	171,533	93,948	35,455
Angles and Tees	128,994	110,865	94,858
Steel Rails	146,542	87,690	49,855
Steel Bars	125,222	120,492	84,853
Billets, Blooms and Slabs	241,979	156,022	29,636
Plates and Sheets	92,549	90,256	78,537
Wire	52,992	53,077	42,093
Galvanized Wire	29,699	29,879	24,096
Railroad Axles, Wheels, &c.	14,754	15,364	15,554
Rolled Tubes	17,999	14,941	12,862
Coarse Iron Goods	42,305	34,255	33,741
Wire Nails	17,196	20,858	16,698
Galvanized Iron Goods	26,900	22,829	18,180

The Ore market has remained in a good condition as the result of the active employment of the furnaces. Prices are firm. The Iron Ore Syndicate has been able to make contracts covering a considerable tonnage to the end of the year. From June 1 prices on Spathic Ore are 10.50 marks; Calcined Spathic, 15 marks, f.o.b. mine. Nassau Red Hematite, with about 50 per cent. Iron, is quoted 10.50 marks, f.o.b. Dillenburg.

The Pig Iron Syndicate has sold the entire product of the blast furnaces to the end of the third quarter. Shipments of Pig Iron are lively and stocks moderate, though they are still being drawn upon. Inquiries are at hand from abroad, notably from America and Belgium. Prices are as follows: Spiegeleisen, with 10 to 12 per cent. Manganese, 67 marks; Mill Iron, 50 marks, f.o.b. Siegen; Bessemer Pig, 67.50 marks; No. 1 Foundry, 66.50 marks; No. 3 Foundry, 64.50 marks, f.o.b. furnace; Thomas Pig, 57.40 marks, delivered at Steel works; Luxemburg Mill Iron, 45.60 to 46.40 marks; Luxemburg Foundry Iron, 52 marks per ton, f.o.b. Luxemburg.

In Steel Billets the requirements which had been held back for a long time developed in such force in April that the works were fully covered within a short time until October 1. What quantities are still required for the third quarter are difficult to place. Home prices for Steel are unchanged, and it is assumed that after October 1 there will be no increase in prices.

The mills rolling Iron Bars have a good deal of work on old contracts, but so far as new orders are concerned consumers and dealers are holding back, and do not desire to commit themselves for long terms.

Steel Bars are officially quoted at 110 marks, but the larger works are selling them down to 107.50 marks, a price which makes it impossible for the smaller works, who must buy their Steel, to exist. So long as free competition rules the Bar market this feature in prices will remain.

The preliminary work on the general German Steel Works Syndicate, which is to include Bars, have developed slowly to permit the question of percentages to be taken up. It is the purpose of the syndicate to include export orders also and later on to establish branch selling offices in foreign countries. At the present time the negotiations are being carried on only by the larger German Steel works, in order to reach a conclusion more rapidly. It is only after the syndicate has been formed that the smaller works are to be taken in.

The Sheet market continues to be weak, and the amount of work for both the Sheet mills and for the Plate mills is inadequate. The Plate Mill Syndicate has reached an arrangement with the Austrian Iron Syndicate by which the two groups protect one another in their territory, so that the one group does not compete with the other in the country of the latter.

The Beam business coninues good, and deliveries are heavier than they were. The price of Beams is unchanged at 105 marks, f.o.b. Burbach.

Business in Cast Iron Pipe has grown livelier as the season progresses, but prices are still in an undesirable condition, particularly since the foreign competition, notably on the part of French works, remains a disturbing factor. Matters in the Cast Iron Pipe business are fairly satisfactory, the activity in building being a favorable influence. Boiler Tubes are slower. The negotiations concerning the renewal of the Pipe and Tube Syndicate are being continued, and it is expected that they will lead to a favorable issue. Sales have begun for the third quarter in Wire Rods, but buyers show little disposition as yet to cover larger lines.

St. Louis.

CHEMICAL BUILDING, July 1, 1903.—(*By Telegraph.*)

Pig Iron.—The Pig Iron market continues dull. There seems to be slightly more liberality in the inquiry the past week, and it is said to be of a more significant and substantial order. There seems little doubt that the amount of Iron in the yards of the consumers is light, and the hand to mouth order of buying, which has been in vogue, will soon be superseded by a placing of requirements for future delivery. This seems to be the general feeling in the trade. We quote f.o.b. St. Louis, as follows:

Southern, No. 1 Foundry	$18.75 to $19.50
Southern, No. 2 Foundry	18.25 to 19.00
Southern, No. 3 Foundry	17.75 to 18.50
Southern, No. 4 Foundry	16.75 to 18.00
No. 1 Soft	18.75 to 19.50
No. 2 Soft	18.25 to 19.00
Gray Forge	16.50 to 17.25
Southern Car Wheel	27.25 to 27.50
Malleable Bessemer	20.00 to 20.50
Ohio Silvery, 8 per cent. Silicon	27.00 to 27.25
Ohio Strong Softeners, No. 1	23.25 to 23.50
Ohio Strong Softeners, No. 2	23.50 to 23.75

Bars.—While there is some little trade coming to the jobbers at this point, generally speaking, this department of the market is quiet, but no more so than is the rule at this particular season of the year. We quote from the mills: Iron Bars at 1.75c. to 1.85c., Steel Bars at 1.80c. to 1.90c., half extras. Jobbers' quotations continue as before, 2.15c. in round lots.

Rails and Track Supplies.—The volume of business in this department of the market seems to be of a substantial order, and the amount of inquiry shows a considerable increase since last reported. We quote as follows: Splice Bars, 2.05c. to 2.15c.; Bolts, with Hexagon Nuts, 3.05c. to 3.15c.; Bolts, with Square Nuts, 2.90c. to 3c.; Spikes, 2.15c. to 2.25c.

Angles and Channels.—A moderate demand is reported by the jobbing trade for Small Angles and Channels. The quotation is nominally 2.40c. for material of this class.

Pig Lead.—The market shows a firm tendency with a good volume of transactions reported. For Missouri brands 4.02½c. is asked, and purchases made on this basis.

Spelter.—The supply of metal is light, and price holds firm at 5.50c. for July delivery.

The United Iron Works Company have been organized at Springfield, Mo., with a capital stock of $650,000, consolidating the interests of the Aurora Foundry & Machine Company with works at Aurora, Mo., and Iola, Kan., and the Sterling Iron Works and Crescent Iron Works of Springfield. The new company have purchased the Pittsburgh Foundry & Machine Company of Pittsburgh, Kan., and will issue bonds to the extent of $250,000, which will be underwritten by the Springfield Trust Company. The officers are C. H. Cole, president; H. T. Hornsby, vice-president and general manager; A. C. Daily, treasurer, and R. P. Bowyer, secretary. The incorporators are C. H. Cole, C. C. Mathey, J. R. Woodfill, Jr., B. F. Hobart, M. T. Davis, O. L. Milligan, E. F. Mathey, E. L. Hobart, B. F. Hobart, Jr., G. W. Cole, Jr., A. C. Dailey, H. C. Mosher, H. T. Hornsby, R. P. Bowyer, H. T. Fellows and Arch McGregor.

The New York Machinery Market.

NEW YORK, July 1, 1903.

General conditions are unchanged. In all branches of the trade machinery merchants have settled down to the quieter pace which has come over the market, and the summer season with its limited demand is very much in evidence. The only feature of interest in the machine tool trade is the official notification of the 5 per cent. advance in the prices of planers, which went into effect to-day. Machine tool merchants received this notification from the planer builders during the last few days. The machine tool trade are devoting considerable attention to the Navy Department, who are making extensive purchases at present. It is stated in the trade that uniform schedules are soon to be adopted by the prominent lathe builders, covering the prices of the various attachments sold in connection with standard lathes, and that a uniformity of price will be arrived at for the extra lengths of lathe beds. The base prices of the machines in their standard forms, we understand, are not, however, to be changed. Prices of other machine tools have not been changed, and from all present indications will remain unchanged for the present.

The suspension of building operations in this vicinity incident to the building trades strikes has had a bad effect upon the high speed engine and small power plant trade in this market. The buildings affected by strikes are principally the large office structures, hotels, theatres, &c., where isolated electric plants are planned in connection with the work. The promoters of these enterprises have, of course, deferred all investment in mechanical equipment for the buildings pending the adjustment of the labor difficulties. Many projects planned for this season's building have been indefinitely postponed, owing to the unsettled labor conditions, and it is now announced that these projects will not be launched this season.

The extensive improvements planned by the New York Edison Company are also being deferred. At the office of the company it is stated that the bids are all in, but that no action will be taken on them at present. They say that a decision to purchase may not be reached for some little time. The labor situation is held to be responsible for this delay, as but a very short time ago the company evinced a desire to obtain their bids in unusually quick time, some large Western concerns going so far as to telegraph their bids.

The sudden suspension of large operations in this manner, due principally to the strike fever, has caused many smaller concerns to lay aside contemplated improvements and purchases, and hence the present slackening of demand. Nowhere is fear expressed that present business conditions will work down to anything like a serious depression; the opinion expressed in the machinery trade is that a quiet summer season will bring matters to a point where, in the fall, activity will be resumed along many of the lines as planned this spring.

Charles Ross & Son Company, builders of paint and printing ink making machinery, of Brooklyn, N. Y., are about to build a new steel frame building, 86 x 228 feet, to be located on Classon avenue, between Park and Myrtle avenues, Brooklyn, which will be used for a machine shop. They are now in the market for their machinery equipment, which includes several large machine tools. They are seeking information as to improved materials for roofs, windows, skylights, &c., as it is desired to make the entire plant as up to date as possible.

The Ideal Electric & Mfg. Company of Mansfield, Ohio, are in the market for a fair sized lot of machinery equipment. They are erecting a new factory building, 80 x 200 feet, two stories, and of fire proof construction. They are in the market for power plant equipment and some machine tools. It is intended to equip the plant with none but thoroughly modern tools. The subject of transmission machinery and small shop tool equipment has not been taken up as yet. The company will produce a complete line of dynamos and motors for the regular line of service, together with special elevator and pump motors. They are also getting out a line of variable speed motors adapted to machine tool usage. The officers of the company are C. H. Voegele, president and treasurer; S. Glen Vinson, secretary and manager; S. E. Huenerfauth, superintendent.

The Erie Railway Company are enlarging the facilities at their shops at Galion, Ohio, and are rearranging the machinery and installing considerable new equipment.

Newspaper reports state that by order of the sheriff the office furniture of the Norfolk-Hampton Roads Shipbuilding Company was sold at auction to satisfy a judgment secured against the concern by the surveyor who plotted out the tract which was to be occupied by the great plant the company proposed building at Sewell's Point, near Norfolk, Va. The furniture brought $103. It will be recalled that this concern sent out a glowing prospectus a short time ago. The company was capitalized on a rather novel basis, the minimum capital being set forth as $500,000 and the maximum $10,000,000.

The Bureau of Supplies and Accounts, Navy Department, Washington, will receive bids until July 14 for the following supplies for the Eastern yards:

Class 1. One 7½ and two 5 horse-power electric motors.

Class 2. One 15 and one 25 horse-power electric motors.

Class 3. Four 35, eight 15, 26 3, four 4, one 8, two 50, two 30 horse-power electric motors, and six hoists.

Class 4. Three 15 horse-power electric motors.

Class 5. One 10 horse-power electric motor.

Class 6. One surface condenser with 500 square feet cooling surface.

Class 7. One 72-inch radial drill.

Class 8. One 5-ton, 1-ton and two 3-ton jib cranes.

Class 9. Eight-ton, 17-ton and 4-ton electric traveling cranes.

Class 10. Three horse-power and 4 horse-power buffing and polishing lathes.

Class 11. One 24-inch screw cutting engine lathe, motor driven, with 14-foot bed.

Class 12. One 20-inch hollow spindle pattern makers' lathe, motor driven, with 10-foot bed.

Class 13. One new model turret lathe for 1-inch stock.

Class 14. One spinning lathe, with 24-inch swing, 69-inch bed.

Class 15. One automatic screw machine, multiple spindle, 1⅜-inch chuck and several sets of tools.

Class 16. One milling machine, motor driven.

Class 17. One Universal grinding machine, 10-inch swing, 30 inches between centers.

Class 18. Power plant, consisting of 117 horse-power engine, direct connected to 75-kw. generator, rotary controverter and accessories.

Class 19. Sensitive three-spindle drill press.

Class 20. One feed pump, capacity, 400 gallons per minute.

Class 21. One vertical steam pump, capacity, 22 gallons per minute.

Class 22. One pressure regulator.

Class 23. One centrifugal steam separator and grease extractor.

Class 24. Two 26-inch shapers, motor driven, quick return stroke.

Class 25. High pressure nonreturn steam trap.

Class 26. Six electrically driven, deck winches.

Class 27. One hoisting engine, cylinders 7 inches in diameter, 10-inch stroke.

Classes 28, 29 and 30, valves, angles, &c.

The Bureau of Supplies and Accounts, Navy Department, Washington, will receive bids until July 21 to furnish at the navy yards, Mare Island, Cal., and Puget Sound, Wash., a quantity of electrical supplies, machine tools, &c.

Bids will be received at the Bureau of Yards and Docks, Navy Department, Washington, until July 25, for the three traveling cranes for the Boston Navy Yard, mentioned in these columns June 18. The cranes are 40, 7 and 5 tons capacity each.

Proposals were opened at the Department of the Interior, Washington, D. C., June 22, for installation of electric motors for freight elevator, lithographic presses and other machinery at the Geological Survey, as follows:

Item 1, motors for elevator; 2, series of motors for presses.

Marine Engine & Machine Company, New York, item 1, $5510.

National Electric Supply Company, Washington, D. C., item 2, $4260.

Otis Elevator Company, New York, item 1, $4100; deduct $310 conditionally.

John C. Rau, Washington, D. C., item 2, $5387.

McCay Engineering Company, Baltimore, Md., item 2, $4665 for Keystone motors, $4980 for Sprague motors.

The bid of the Ellicott Machine Company of Baltimore, Md., $9334 in amount, has been accepted for furnishing seven chain ammunition hoists under bids opened June 12 by the United States Engineer at Boston, Mass.

The Union Railway Company of New York City are building three new substations in the vicinity of New York, one at West Farms, one at Mount Vernon and the other at Yonkers, all of which are to be equipped with Westinghouse apparatus. They will be operated by the large power station at Kingsbridge, which is owned by the Interurban Street Railway Company, having been built by Westinghouse, Church, Kerr & Co. and the Westinghouse Electric & Mfg. Company. The substation at West Farms will contain nine 375-kw. oil insulated static transformers, divided into three groups, supplying current to three 1000-kw. rotary converters. The switchboard consists of high tension A. C. receiving panels, with electrically operated oil circuit breakers, low tension A. C. rotary panels and load panel, with direct current rotary panels and load panel; also about 20 D. C. feeder panels. The other two substations, now in course of construction, will have similar equipments, excepting that the capacity in each case will be three 500-kw. units instead of three 1000-kw. units. The entire equipment for each substation is being furnished by the Westinghouse Electric & Mfg. Company.

W. E. Baker of 170 Broadway, New York, who is purchas-

ing the equipment for the new power plant to be erected near Columbus, Ohio, for the Scioto Valley Pool, is now awarding contracts for the feed water heaters and similar steam specialties.

The Edison Electric Illuminating Company, at Brooklyn, N. Y., will install a new 4500 horse-power Westinghouse vertical cross compound Corliss engine in their Bay Ridge Station. The engine will be direct connected to a Westinghouse polyphase generator, similar to those already installed, and the new unit will increase, the capacity of the plant to 13,500 horse-power, with a maximum of 20,000 horse-power. The two 4500 horse-power units now in operation were also furnished by Westinghouse, Church, Kerr & Co. The Coney Island & Brooklyn Railroad Company will install a 26 x 52 x 48 inch Westinghouse horizontal cross compound Corliss engine, direct connected to a Westinghouse 800-kw. 600-volt generator. The new unit will operate in the South Brooklyn plant in connection with the present equipment. The engine has a capacity of 1250 indicated horse-power, with a maximum of 2100 indicated horse-power. Four 225-kw. Westinghouse compound engine generating units will also be simultaneously installed. The Boston Northern Railway Company will install in their power station at Lynn, Mass., a 30 inch and 60 x 48 inch Westinghouse horizontal cross compound engines of 1620 indicated horse-power capacity, with a maximum of approximately 3000 indicated horse-power. The engine will be direct connected to a 1500-kw. Westinghouse generator, furnishing current at 600 volts to the railway system.

Woolston & Brew of 39 Cortlandt street secured the 1500 horse-power engine order of the Hartford Rubber Company of Hartford, Conn. A horizontal cross compound engine of the new Brown-Corliss type will be installed.

The Houston Electric Company of Houston, Texas, have purchased a 1200 horse-power cross compound condensing engine from Hooven, Owens & Rentschler of 39 Cortlandt street through Stone & Webster of Boston, Mass., who are retained as consulting engineers. The engine will be direct connected to a General Electric generator.

McIntosh & Seymour secured the 3000 horse-power engine order of the Columbia Cordage Company of Auburn, N. Y.

In order to meet the increased demand for their iron lined brass and bronze tubes, the Phenix Tube Company, 182-192 North Eleventh street, Brooklyn, N. Y., are enlarging their plant to double the present capacity. A gas producer plant and Westinghouse gas engine are being installed.

Purchases are now being made by the Marksboro Portland Cement Company for their new plant at Marksboro, N. J. It will be recalled that this project was under consideration some months ago, and that the purchases were temporarily set aside pending the completion of financial arrangements. The company have just placed an order with the Ruggles-Coles Engineering Company of 39 Cortlandt street for an outfit, consisting of four large marl dryers.

The American Steel & Wire Company have purchased six large cinder cars from M. H. Treadwell & Co. of 95 Liberty street, New York, for installation in their central furnace plant in Cleveland.

The business of the Waterbury Rope Company, 69 South street, New York, will hereafter be carried on under the name of Waterbury & Co. The management of the company will remain the same.

The Reierson Machinery Company, general machinery merchants of Portland, Ore., are looking about with a view of getting the agency for a first-class marine engine of the gasoline type, and also for an automobile engine.

The Glacier Metal Company, manufacturers of Glacier anti-friction metal, of New York and London, have established a Southern office at Richmond, Va. Their trade in the South has increased to such proportions that it has been found necessary to place a separate branch of the business in this field. F. N. Howard is in charge of the new office.

The New Jersey Foundry & Machine Company, manufacturers of overhead tracking systems, cranes of all descriptions, Diamond expansion bolts, &c., have moved their New York offices to larger quarters located in the Franklin Building, 9-15 Murray street.

The following are among the bids for supplies for the Mare Island and Puget Sound navy yards, opened June 16, at the Bureau of Supplies and Accounts, Navy Department, Washington:

Bidder 14. Cleveland Crane & Car Company, Wickliffe, Ohio.
37. Niles Tool Works Company, Hamilton, Ohio.
53. Industrial Works, Bay City, Mich.
91. Morgan Engineering Company, Alliance, Ohio.
93. Manning, Maxwell & Moore, New York.
105. Brown Hoisting Machinery Company, New York.

Class 92. Four electric traveling cranes.—Bidder 93, $11,164; 14, $13,200; 37, $14,850; 91, $20,640.

Class 93. Locomotive crane.—Bidder 53, $9200 and $9450; 105, $13,125.

The following bids for machine tools for the Eastern yards were opened at the Bureau of Supplies and Accounts, Navy Department, Washington, June 16:

Bidder 1. Garvin Machine Company, New York.
2. Edward A. Temple, New York.
3. Joseph A. Clipsham, Philadelphia; informal; no guarantee.
4. Manning, Maxwell & Moore, New York.
5. Drew Machinery Agency, Manchester, N. H.
6. Prentiss Tool & Supply Company, New York.
7. Brown-Wales Company, Boston, Mass.
8. Cotter, Wood & Stevens Company, Boston, Mass.
9. Hill, Clarke & Co., Boston, Mass.
10. Hamilton Machine Tool Company, Hamilton, Ohio.
11. Williams, White & Co., Moline, Ill.
12. H. W. Hayes & Co., Boston; informal; no guarantee.
13. Hendey Machine Company, Torrington, Conn.
14. Roy H. Beattie, Fall River, Mass.
15. Geo. Gordon Machine Company, Racine, Wis.
16. Carnegie Steel Company, Pittsburgh, Pa.
17. Montgomery & Co., New York.
18. Niles Tool Works Company, Hamilton, Ohio.
19. Atlantic Works, Philadelphia, Pa.
20. Manhattan Supply Company, New York.

Class 3. Portable deck planer.—Bidder 4, $450; 19, $475.

Class 4. Engraving machine.—Bidder 18, $412; 15, $524.

Class 5. Nickel plating plant.—Bidder 8, $520.

Class 6. Double punching machine.—Bidder 1, $1820; 11, $1195; 6, $2075; 5, $2120; 4, $2305.

Class 7. Three-swing back geared engine lathe, &c.—Bidder 18, $2357; 4, $2573; 10, $2577; 9, $2937; 13, informal; bid on part of class only.

Class 8. Polishing and buffing head on pedestal.—Bidder 8, $33; 5, $66.

Class 9. Upright drill.—Bidder 9, $71.50; 18, $72; 4, $75.

Class 10. Universal grinding machine.—Bidder 18, $645.

Class 11. Tool makers' engine lathe.—Bidder 18, $588.

Class 12. Bench speed lathe.—Bidder 9, $80.95; 6, $89; 4, $120.

Class 13. Sensitive drill.—Bidder 4, $92; 18, $100.

Class 14. Pillar shaper.—Bidder 18, $387; 13, $306.

Class 15. Engraving machine.—Bidder 18, $494; 14, $497.50.

Class 16. One Yale compound lever and pinion gap shear, one drilling machine, &c.—Bidder 18, $133.

Class 17. Seven circle diameters, two sets milling cutters, &c.—Bidder 20, $477.24; 17, $519.10.

Class 18. Medium steel beams.—Bidder 16, $116.85; 7, $171; 2, $156.18.

The Bureau of Yards and Docks, Navy Department, Washington, will receive bids until July 18 for a three-motor, 15-ton electric traveling crane for the Boston Navy Yard.

New York.

NEW YORK, July 1, 1903.

Pig Iron.—The market continues very quiet so far as large business for future delivery is concerned, but is fairly active for small lots for prompt. An order has been placed for about 5000 tons of Central Pennsylvania Iron for malleable purposes for Connecticut and New York delivery at about $20 per ton, delivered. The order for 23,000 tons of Pig Iron for delivery to Western harvester manufacturers has not yet been placed. It was the intention to purchase foreign Pig Iron to be used for export business. It is understood, however, that in spite of the drawback domestic Iron was available at a lower price. The coal miners in Alabama went out to-day, so that there is a possibility that the production of Pig Iron may be seriously cut down. We quote, nominally, for delivery at New York and tidewater: Northern No. 1, $19.50 to $20; No. 2 Foundry, $18.50 to $19; No. 2 Plain, $18 to $18.50. Tennessee and Alabama brands, No. 1, $19 to $19.50; No. 2, $18.25 to $18.75, and No. 3 Foundry, $18 to $18.25.

Steel Rails.—Thus far there have been officially reported by the Rail mills orders for 1904 delivery, aggregating 250,000 tons. Prompt deliveries are now quite readily made, and there have been isolated cases of a demand that delivery be delayed till 1904. Thus far the Eastern roads have placed few orders for next year, and some of the Western roads are holding back to await crop developments. Buyers who contemplate ordering foreign Rails are receiving intimations to the effect that competition from that quarter will be met. We continue to quote $28 for Standard Sections, at Eastern mill.

Cast Iron Pipe.—The only news of any importance this week is that the 10,000-ton Brooklyn contract was placed with the Warren Foundry & Machine Company. It consists mainly of 48-inch Pipe. As the Pipe manufacturers have been desirous of securing contracts for large sizes, this order induced rather sharp competition. The usual excellent demand for small lots continues. Carload lots of 6 and 8 inch are quoted at $36, gross ton, and 12 inch and upward at $35, tidewater.

Finished Iron and Steel.—The American Bridge Company have booked several nice orders. Among them are a

6500-ton building for the Schenectady shops of the General Electric Company; the Sayre shops of the Lehigh Valley Railroad Company, at Sayre, Pa., taking 6000 tons, and a 3000-ton warehouse at Buffalo. The company report a good run of regular business and plenty of inquiries. Some of the independent bridge companies are not doing as well as they would like, and are seeking orders with more or less urgency. The Plate trade is quiet in this vicinity, and not much improvement is expected until the labor troubles are settled. Bar Iron is quiet, but prices seem to have found bottom, temporarily at least, and nothing under 1.65c., at mill, is reported. We quote, at tidewater, as follows: Beams, Channels and Zees, 1.75c. to 2c.; Angles, 1.75c. to 2c.; Tees, 1.80c. to 2c.; Bulb Angles and Deck Beams, 1.90c. to 2.25c. Sheared Steel Plates, in carload lots, are 1.78c. to 2c. for Tank, 2c. to 2.10c. for Flange, 2.10c. to 2.20c. for Marine and 2.25c. upward for Fire Box. Refined Bars are 1.75c. to 1.90c.; Soft Steel Bars, 1.75c. to 1.90c.

Old Material.—A decidedly unsettled condition prevails. It is difficult to quote on any class of material at present, as consumers are almost completely out of the market. Such sales as are made merely represent forced transactions and are not regarded by dealers as indicating the true value of the material thus changing hands. Some bargains are thus reported in Wrought Scrap. A sale of this character has been made to a consumer in this vicinity at probably $2 per ton less than the rates recently ruling. Prices are lower on Steel Scrap, although the consumption in this line continues comparatively heavy. Old Iron Rails, which but a short time ago were exceedingly scarce and dear, are now being freely offered without finding buyers. Relaying Rails are likewise in much greater supply and prices are therefore reduced. Quotations, which must still be considered only approximate, are as follows per gross ton, New York and vicinity:

Old Iron Rails	$21.00 to $22.00
Old Steel Rails, long lengths	20.00 to 21.00
Old Steel Rails, short pieces	17.50 to 18.50
Relaying Rails, heavy sections	25.00 to 26.00
Relaying Rails, lighter sections	28.00 to 29.00
Old Car Wheels	19.50 to 20.00
Old Iron Car Axles	26.00 to 27.00
Old Steel Car Axles	24.00 to 25.00
Heavy Melting Steel Scrap	17.50 to 18.50
No. 1 Railroad Wrought Scrap Iron	18.50 to 19.50
Iron Track Scrap	18.00 to 18.50
Wrought Pipe	14.00 to 15.00
Ordinary Light Iron	10.00 to 11.00
No. 1 Machinery Cast Scrap	16.50 to 17.00
Stove Plate	11.00 to 11.50
Cast Borings	7.00 to 7.50
Wrought Turnings	14.00 to 14.50

Metal Market.

NEW YORK, July 1, 1903.

Pig Tin.—Throughout the week under review the market has remained practically unchanged. There has been no increase in demand and prices are at about the same level as last week, with the exception that there was more activity in bidding for the future. These bids brought out indications of considerably lower prices for future delivery than are quoted for spot at present. Consumers are buying very slowly, indicating that stocks in the interior, especially in the West, are still very full. Deliveries into consumption during the month of June showed a falling off of 1000 tons as compared with the month previous. The market closed to-day with 28¼c. asked for spot and no bids. It is stated in the trade that spot can be secured for 28.12½c. outside of the Exchange. Futures were quoted as follows: July, 27.87½c. to 28.25c.; August, 27.75c. to 28c.; September, 27.62½c. to 27.87½c.; October, 27.50c. to 27.75c. The London market closed £127 15s. and £125.

Copper.—The market is still very dull with an extraordinarily light demand continuing. The "Official" quotations are unchanged, 14.50c. being quoted for both Lake and Electrolytic and 14c. for Casting. The article is, however, quoted considerably lower outside of the Exchange, the "Official" prices being easily shaded ½c. The London market closed somewhat higher than last week, with £57 10s. for spot and £57 2s. 6d. for futures. Best Selected has advanced to £63. The exports for the month of June aggregated 8585 tons, showing a very marked decrease (4673 tons) as compared with the month of June last year, when there were 13,258 tons exported. The exports for the first six months of this year show a total of 63,816 tons, as compared with 94,641 tons for the corresponding period of last year. It is generally remarked in the trade that in view of this decrease in exportation and the slight demand which has characterized the market for some time past the country can well do without the product of any of the large groups of mines for a short period. This comment is called forth by the announcement to the effect that the Amalgamated Copper Company will close down the Anaconda, St. Lawrence, Parrot, High Ore, Never-Sweat, Diamond, Belle and Moonlight mines for a period of six weeks, thus curtailing productions by about 9000 tons.

Pig Lead.—The market remains unchanged. The "official" price is still 4.12½c. for Desilverized in carload lots and 4.10c. for 50-ton lots. St. Louis has declined a shade, being quoted 3.97½c. to 4c., and London has still further advanced, naming £11 16s. 3d. at the close to-day.

Spelter.—The scarcity in spot continues and the quotation here at this writing is 6.12½c. to 6.25c. St. Louis quotes 5.60c. and London has recovered to £20 5s.

Antimony.—The price of Cookson's remains unchanged at 7.50c., but Hallett's and the other brands have again suffered a ¼c. reduction. Hallett's is now quoted 6.62½c. and other brands 6.37½c. It is stated in the trade that there are large stocks of this metal here at present.

Nickel—Is quoted at 40c. to 45c. for large quantities and 50c. to 60c. in small lots.

Quicksilver.—A moderate business is reported, the market ruling at $47.50 for flasks of 76½ lbs.

Tin Plate.—No change worthy of note has occurred in this market, which remains firm. Current transactions are of moderate proportions. Prices remain firm. The American Tin Plate Company's quotation continues at $3.80 per box of 14 x 20, 100-lb. Cokes, f.o.b. mill, which is equivalent to $3.99, New York.

Fred. L. Downs, dealer in Metals, has removed from 114-118 Liberty street to 213 Pearl street, New York.

New York and New Jersey Foundrymen's Association.

Representatives of a majority of the foundries in Greater New York and vicinity met in the Gilsey House, New York, Tuesday night, and organized an employers' association. The organization will be known as the New York and New Jersey Foundrymen's Association, and the following officers were elected: President, H. Van Atta of the J. L. Mott Iron Works, New York; vice-president, Lawrence Fagan of the Fagan Iron Works, Hoboken, N. J.; treasurer, Francis J. Jackson of the Hecla Iron Works, Brooklyn; secretary, Henry C. Hunter, counsel for the New York Metal Trades Association. The Executive Committee consists of the officers, *ex officio*, and John J. Riley of the John J. Riley Company, Brooklyn; T. Shriver of Shriver & Co., New York, and J. F. Arnold of Snead & Co., Jersey City.

Most of the foundries are members of the National Founders' Association of America, and the new organization will work with the National Association, but, it is asserted, will have to do with local conditions, and will endeavor to obtain for the local manufacturers independence in the management of their foundries.

Those who were present at the meeting and who approved of the movement were:

H. Van Atta, J. L. Mott Iron Works, New York.
H. N. Covell, Lidgerwood Mfg. Company, New York.
W. W. Perrin, Essex Foundry, New York.
W. G. Creamer, W. G. Creamer & Co., Brooklyn.
Lawrence Fagan, Fagan Iron Works, Hoboken, N. J.
W. P. Hampson, W. P. Hampson, New York.
J. Ferguson, F. Ferguson & Son, Hoboken.
Benjamin Fox, Benj. Fox's Sons, New York.
John Hutton, T. Shriver & Co., New York.
John J. Riley, John J. Riley, Brooklyn.
J. L. White, Acme Iron Works, Brooklyn.
F. J. Laughlin, Healy Iron Works, Brooklyn.
John May, Wiard Foundry Company, Brooklyn.
W. H. Holdsworth, Brooklyn.
A. P. Hill, National Foundry Company, Brooklyn.
Peter Kuntz, Gaits, Peace & Co., Brooklyn.
Jos. A. Grobholz, Thom & Co., Jersey City.
Francis T. Jackson, Hecla Iron Works, Brooklyn.
J. T. Arnold, Snead & Co. Iron Works, Jersey City.
N. B. Brown, Richey, Brown & Donald, Long Island City.
William M. Duffus, National Iron Foundry, Brooklyn.
Frederick Russell, Jos. McGee Company, Long Island City.
Charles B. Nagel, Universal Iron Foundry, Brooklyn.

The following companies have also signified their intention of joining the association:

Charles Creighton Foundry Company, New York.
Henry Huber Company, New York.
Ignatz Wasserstrom, New York.
Brown & Patterson, Brooklyn
C. O. Brown, Brooklyn.
Jefferson Brass Foundry, Brooklyn.
J. H. Bawden & Co., Freehold, N. J.
J. B. & J. M. Cornell, New York.
Bell & Fyfe, Brooklyn.
Isaac G. Johnson & Co., New York.
Samuel Metcalf, Brooklyn.

Philadelphia Machinery Market.

PHILADELPHIA, PA., June 29, 1903.

There has been little change in the condition of the Philadelphia machinery market during June, when compared with the previous month. More or less irregular features are noticeable which are not unusual at this season. Semi-annual stock taking is in progress with both manufacturers and consumers in many instances, and purchases therefore of both machinery and supplies are deferred until later dates. Labor troubles have continued to unfavorably influence many lines, although settlements have been made in most cases.

Constructional work and general building has, however, been much delayed and improvements to plants, &c., which should have been completed some time ago, are in some instances just being started. This condition has had its influence on manufacturers in cases where goods have been ready for shipment, but owing to the buildings, &c., in which they were to be installed not having been completed orders to withhold shipment have been received.

The volume of business on the order books of the various manufacturers continues about as last month. The builders of large tools, special machinery, locomotives, cranes, &c., continue extremely busy, and the production of their plants for the balance of the year is almost all contracted for, while orders for next year's deliveries continue to be taken. The general run of the medium sized shops have from three to four months' work ahead, with a nice day to day business coming in. The smaller plants are probably feeling the absence of new business somewhat, but even these plants continue to do a nice business. Exceptions to the above conditions are, of course, noticeable, and while the immense amount of business which was on the market several years ago is not apparent now it is the opinion of many that a prosperous condition of trade will continue for some time to come.

Inquiries in some lines have very largely increased, while in others a corresponding decrease is noticeable, and the replacement of orders does not appear to follow quotations as rapidly as may be desired, but some good business has developed from earlier inquiries. At this season, however, quotations are frequently asked to get lines on probable cost of productions for the last half of the year, and the orders often follow later on.

The various iron and steel foundries continue very busy, and owing to labor difficulties in some sections have been working more or less irregularly. In the last week, however, a settlement which governs many of the local and nearby foundries has been made, in the nature of an agreement to a truce, final action being deferred until a later date—meantime strikes and lockouts are barred. Foundries are now obtaining supplies of pig iron, coke, &c., with promptness and regularity, and should be able to catch up on delayed deliveries.

There is no change in the foreign demand. Manufacturers transacting a regular business abroad continue to do a fair trade, but new developments are few, specialties making up most of the volume of export business.

The demand for medium standard and special machines and tools continues fair. Machinery floors continue well stocked, and good deliveries can generally be made. Dealers report a very good month's business for June.

Inquiry for the smaller engines, boilers, machines and tools is fair, and some good sales have been made with varying deliveries. Machine shop supplies are in good demand, and deliveries in some lines have improved.

Prices continue strong, and in some instances a slight advance is being asked. No tendency to shade quotations to get business is apparent.

The Atlantic Works, Incorporated, manufacturers of machinery for working wood, have had plans prepared for a two-story factory building, 63 x 180 feet; a blacksmith shop, 32 feet square, and a boiler house, 28 x 50 feet. It is expected that operations will be started on the above in the very near future.

The Keystone Drop Forge Company are busy moving to their new plant at Chester, Pa. Almost all the machinery has by this time been removed and transferred, and a large part is already in operation at the new plant. It is expected that the removal from the local plant will be completed during the next week.

The new machine shop being erected for Hugo Bilgram on Spring Garden above Twelfth street, the completion of which has been greatly delayed by strikes in the various building trades, is now about ready for the roof. This building will be entirely modern in its construction and appointments. Concrete has been extensively used in its construction, the floors, pillars and roofs being all constructed of this material.

The Hess Machine Works have had a satisfactory month's business. The foreign demand for file making machines has been good, and some nice orders have been booked. One set of machines has recently been shipped to parties in England and two sets to customers in Germany. These machines were all of the standard type.

I. H. Johnson, Jr., Company, Incorporated, have had a good month's business; inquiries for lathes have been numerous, and though they do not all lead up to prompt business, a good share of orders has been taken. All departments of their plant continue busy, and a number of standard and special lathes have been shipped during the past month, including one 42-inch swing by 30-foot bed, with two sets of heads, for nearby parties, and several 24, 20 and 18 inch swing tools, with various length of beds for local purchasers and for parties in the Middle West.

The Espen-Lucas Machine Works report a satisfactory condition of business, demand for their I-beam and foundry cold saws is good, and the plant is busy on numerous orders for this class of work. There is also a good demand for special tools, and several floor boring, milling and drilling machines are about ready for shipment. Shipments of their various tools to local and nearby parties continue, and several deliveries of cold saws to customers in the Middle West have been made.

W. E. Shipley, representing the Lodge & Shipley Machine Tool Company, reports business of a satisfactory nature. Inquiries continue numerous, but do not result in business as promptly as last month. The demand during the past month has covered quite a range of tools, and a number have been shipped to local and nearby customers.

The J. R. Van Dyke Company have had a very satisfactory month's business, the demand for lathes and Higley cold saws being the most active. These parties have added to their extensive lines the radial drills and floor boring machines manufactured by the Fosdick Machine Tool Company, Cincinnati, Ohio. A number of shipments have been made of lathes, cold saws and other tools, mostly to local parties.

Dallett & Co. report a large business in steam shovels, locomotive and railway rolling stock. Several steam shovels have been recently sold to various parties, and the sale of another large one is just reported. These parties are also furnishing the electrical equipment for the Allentown & Reading (Pa.) Traction Company.

A satisfactory month's business is reported by the Falkenau-Sinclair Company, whose plant has been continuously busy. Inquiries are being received in good qantity, and a nice lot of orders has been booked. The demand is most active in the line of standard presses and tools, while orders for special machines have also been taken. Some recent deliveries include a 150,000-pound vertical screw testing machine for a local concern and a number of various sizes of standard presses for nearby parties. A 10-foot cornice press has been shipped Pittsburgh parties, and a large hydraulic press is about ready for delivery to New York parties.

The Philadelphia Roll & Machine Company continue to do an exceptionally large business in both chilled and sand rolls, a number of which have been shipped to various iron and steel mills. Inquiries for general castings are also good, and orders are on hand for several months' steady work. Some special castings which have recently been made for local parties include an air furnace, charcoal iron engine shaft, to replace one made of steel; this shaft is 18 inches in diameter and 20 feet long, with a 30-inch flange, its net weight being 14,750 pounds. Several heavy valve castings weighing nearly 5000 pounds each have also been recently made for a local concern.

F. R. Phillips & Sons Company have just shipped for export to Scotland some special rolling mill machinery, which, it is said, will make a radical improvement in methods employed in the mills in that country. These parties report quite an extensive demand abroad for this particular class of machinery, and some very nice business is in sight.

The Philadelphia Pneumatic Tool Company have had a very satisfactory month's business. The demand for hammers and drills has increased from both foreign and domestic sources, and all departments of their plant are kept continuously busy. Shipments of hammers, drills and other pneumatic tools for export have been made to London, Copenhagen, Denmark, Belgium, Italy and other places on the Continent. Domestic orders, on most of which shipments have already been made, include the General Electric Company, Lynn, Mass.; Craig Shipbuilding Company, Toledo, Ohio; Williamette Iron & Steel Company, Portland, Ore.; Kewanee Boiler Works, United Gas Improvement Company, J. D. Connell Iron Works, New Orleans; the Chandler & Taylor Company, Allis-Chalmers Company, and a number of others.

The Tabor Mfg. Company note an increase of business over last month, and have a correspondingly large number of orders on their books. Inquiries are more plentiful, particularly from the Middle West, where a good trade for their class of molding machines has been secured. The Tabor Mfg. Company are now shipping molding machines to various machine tool builders, locomotive shops, hardware manufacturers and iron foundries, as well as exporting to France and Italy. Two 16 x 32 power ramming, split pattern machines have been shipped to each of the above countries. This company with their recently increased facilities are able to keep well up with their work, and a number of machines are waiting to go out, subject to the completion of the several customers' new foundries.

The Eynon-Evans Mfg. Company are busy installing machinery in the various new additions to their plant (previously mentioned in these columns), which, when completed, will greatly facilitate their capacity for handling materials and thereby increase their production. Business during the past month with this company has been good and inquiries are numerous. The foundry and machine shop are particularly busy, while the other departments are equally active. Recent deliveries include a number of steam jet blowers for shipment to Milwaukee, Wis., and Waukegan, Ill., parties.

The American Pulley Company continue busy, demand for their all wrought steel pulleys has increased both from foreign and domestic sources, a good number of orders are on hand and future business appears favorable. Shipments for export to New Zealand are being made regularly every month, and a good number of pulleys have been recently exported to China and Australia. Shipments in quantity are also being made to the Southern States, to the Middle West and the Pacific Coast, while the local requirements are equally large.

Inquiries for cranes and hoists continue to be received in large number by the Alfred Box Company, and all departments of their plant are exceedingly busy. Orders have been received which will insure full work for their shops for some months to come. Among recent orders may be mentioned a 20-ton hand power traveling crane for the Second & Wyoming Station of the Philadelphia Rapid Transit Company; a 15-ton, three-motor electric traveling crane has been ordered by Williamson Bros. & Co. for their new foundry, and a 12-ton, three-motor electric traveling crane, with runways, complete, will be built for the power station of the new United States Mint, Denver, Col. Shipments of a 5-ton, hand power traveling crane to the Ramapo Iron Works, Hillsboro, N. Y., and two electric hoisting trolleys for the Newport News Ship Building & Dry Dock Company, Newport News, Va., are to be noted.

The Crane shop of the Niles-Bement-Pond Company has booked more orders for cranes during June than for any month during the past year. Inquiries are numerous, and the prospects for continued activity are most favorable. In order to meet this heavy demand the plant has been running on double turn for some time. Addition will also be made to their power station, and some new equipment will be installed.

The Energy Elevator Company were not materially interfered with by the fire which destroyed adjoining buildings, as reported in last week's issue of *The Iron Age*. Deliveries will not be interfered with, their principal loss being from damage by water. Business conditions with the Energy Elevator Company have been exceptionally good, the demand for elevators, both in this city and in the country generally, being large. This company are now equipping the new Childs Restaurant, Market above Twelfth street, with their entire supply of elevators and dumb waiters. Two electric passenger lifts have also been completed for Atlantic City, N. J., parties. Elevators have also been shipped to Cape May, N. J.; Grand Rapids, Mich.; Decatur, Ill.; Sharon, Pa.; Martinsburg, Iowa; San Angelo, Texas; White Lake, S. D., and Selingsgrove, Pa. A contract has also been taken for a special hospital elevator for the Samaritan Hospital in this city. This elevator will be large enough to accommodate a bed and two assistants.

Activity continues unabated at the plant of the Baldwin Locomotive Works. Inquiries are being received in large numbers, and are now principally coming from individual corporations rather than from the large railway companies. Sufficient orders have been received to insure continued working of the plant at its full capacity well into 1904. This company have during the first five months of the year shipped the unprecedented total of 820 locomotives, and will have increased this total to over 1000 locomotives for the first half of the year. The new Twenty-sixth street erecting shop, the building of which has been delayed, awaiting the action of the city in regard to the abandonment of certain streets, has now been started and will be pushed to completion. Shipments of engines recently made include the balance of an order for 27 locomotives for the Wheeling & Lake Erie Railroad, and deliveries on the orders of the Norfolk & Western Atlantic Coast Line, Mobile & Ohio, Southern Railway, Southern Pacific, Pittsburgh, Shawmont & Northern and other railroads. Deliveries have also been made to numerous individual companies.

Chicago Machinery Market.

CHICAGO, ILL., June 27, 1903.

The month of June has brought some changes of significance in the machinery industry. The general tendency has been toward a decreased volume of business, both as compared with previous months of the present year and with the corresponding month of a year ago. At the same time there have been important and noteworthy exceptions to the rule. In general, both manufacturers and dealers attribute the declining tendency to the continuation of labor troubles, and also to the anticipation of lower prices for manufactured goods brought about by lower prices for raw material. Manufacturers of machinery, however, point to the fact that whatever advantages may have accrued from lower prices of raw material have been fully offset by the increased cost of labor, and hence lower prices for machinery cannot be consistently expected, especially should the demand continue even at a less rate than during the preceding six months. One of the unfavorable indications which is noted especially by dealers is the difficulty in making collections, even from financially strong companies.

The decrease in new orders taken during the month of June has been more conspicuous in the line of machine tools than in boilers, engines, pumps and transmission machinery. Trade in the city of Chicago and immediate territory seems to have suffered more than business in territory less under the domination of labor unions.

But, while it is evident that the high pressure speed, which has been the prominent feature in all industrial lines for many months, has been lowered, there exists enough momentum to carry trade over a quiet summer into the autumn, when a general increase in business is anticipated.

A somewhat thorough analysis of trade conditions in the machinery line indicates that there is no unsoundness either financially or otherwise in the general situation, but that the present slowness is, in large measure, due to the conservative feeling among the smaller manufacturers; a disposition to protect themselves against contingencies—from the conviction that while prices may not be any lower they will certainly be no higher, either for raw material or for the finished product.

In some respects the situation is in marked contrast to conditions prevalent a year ago when most manufacturers of machine tools could not promise deliveries under many months, and dealers were being flooded with orders and urged for prompt shipment. To-day many manufacturers will take orders for relatively early shipment, and dealers are well supplied with stock for prompt delivery. However, these conditions are, in a measure, due as much to the increased capacity of the manufacturer as to any decrease in demand, and while purchasers are not making personal urgent calls upon dealers and manufacturers, there is considerable business of one kind and another offering which, during ordinary times, would seem of considerable volume, but with the recent abnormal consumption suffers by comparison.

It is notable that trade, especially in engines, during the past month has included fewer very large units than for many months. However, the aggregate of small sizes ordered has made a fairly large volume of business; and, as heretofore, railroads and iron and steel plants have given the greatest support to the machinery industry. Yet some very satisfactory orders have been contributed by implement manufacturers, bridge and structural iron works, boiler works, mining companies, cement plants, saw mills, oil mills and electric light plants, and nearly all of these interests are still important factors.

Improvements in Sight.

Naturally much more interest is felt in the future than in the past, and the indications point to a liberal volume of business for the remainder of the calendar year. In the city of Chicago some very large business is in sight, although depending upon developments. The Illinois Steel Company are preparing to spend several millions of dollars at the South Works, Chicago, dimensions of the various buildings and a general idea of the equipment being given in the last issue of *The Iron Age*. Some very large orders for engines and machinery have already been placed and many more contracts remain to be consummated. During the month the order for the equipment of the cement plant, including prime movers, grinding machinery and rotary kilns, involving an expenditure of $250,000, has been placed with the Allis-Chalmers Company. The Carnegie Steel Company of Pitts-

burgh have also placed an order for similar machinery. In the two orders are 28 Gates ball mills, 39 5 x 22 feet Gates tube mills and 24 rotary kilns of special design.

Considerable hoisting power transmission and other machinery for the projected retort coke plant at South Chicago will doubtless be placed in the near future. The International Harvester Company have also been in the market for machinery for their new furnace and steel plant, and it is understood that some orders are still waiting lodgment.

The Grand Crossing Tack Company have placed and are placing contracts for the equipment for the open hearth plant now nearing completion on the Calumet River.

The Union Pacific Railway is reported to have completed a list of tools and machinery for 1904, but it is understood that they will not be in the market for some time. The Rock Island Railroad, which has been placing large orders for delivery at Moline, is reported to have other requisitions.

Considerable activity is reported in Texas, Oklahoma and Indian Territory, where many new branch roads are being constructed. The Missouri, Kansas & Texas and a number of its affiliated roads have placed orders for isolated water plants, including stand pipes, water towers, pipe lines, &c.; for coal stations which have called for the installation of gas engines, elevating and conveying machinery. There is still considerable of this work under negotiation.

During the past month the Alton, the Rock Island, the Chicago, Burlington & Quincy, the Northwestern, the Santa Fé and the Missouri Pacific railroads have placed orders for a number of renewals for isolated plants and station equipment for their lines, and considerable of this business is still in sight, although the recent floods have interfered considerably with the pushing of this work.

The Chicago, Milwaukee & St. Paul Railroad have been and are now buying tools, machinery, motors and supplies in large quantities. Quite a comprehensive list has been issued, and the demand for such material does not seem likely to fall off to any extent in the near future.

The Michigan Central Railway, while not in the market at the moment for machine tools, is likely to have some requisitions in the near future.

The Chicago City Railway is negotiating with the city for the privilege of taking water for condensing purposes from the tunnel passing through Thirty-ninth street. If this is allowed, real estate will probably be purchased in the immediate neighborhood for a new power station. If not, the company will probably go further South. At least very comprehensive plans are under way for a new power station, the number and size of the units, however, depending upon the location of the power house. A large amount of money will be expended for machinery when plans are completed.

The Union Traction Company will spend many thousands of dollars in improvements and extensions as soon as the matter of franchise is settled with the city. Machinery manufacturers are watching developments with much interest.

The Jenney Electrical Company of Indianapolis, who have recently increased their capital stock from $80,000 to $450,000 for additions, improvements and additional equipment, announce that they will be in the market in the near future for several machine tools and factory equipment.

The Michigan Novelty Works, at Kalamazoo, Mich., will increase their facilities threefold within 30 days. They have recently purchased some machine tools, and will soon be in the market for additional machinery.

The Sound Iron Works of Everett, Wash., are about to install additional machinery, which will about double the capacity of their plant.

Pawling & Harnischfeger of Milwaukee have under consideration plans for the building of an entire new plant on National avenue near the city limits of Milwaukee. While the details are not completed, it is known that additional equipment to a considerable amount will be required.

The Burlington Foundry & Machine Shop, Burlington, Kan., have recently purchased a few machine tools, and are now negotiating for other machines.

The Holthoff Machinery Company, Cudahy, Wis., manufacturers of mining machinery, contemplate adding additional equipment to their machine shop at an early day, being obliged to take this step because of the increased orders secured for their product.

It may be of interest to know that engineers who confine themselves largely to supplying the wants of ore handling apparatus for furnaces and railroads announce that they have secured work sufficient to keep them busy for a full year without additional work, but that considerable new business of this character is coming up, with the prospect favorable that much of this business will eventually be placed.

The Star & Crescent Milling Company of Chicago have just purchased property at South Chicago, upon which they will erect a modern flouring mill and elevator. Plans have been completed by Frazer & Matthews of Milwaukee. It is understood that construction will be begun at once. Considerable machinery will be purchased for equipment in the near future.

Plans are being prepared for a new power house to be erected by the Monarch Refrigerating Company on North Water street, Chicago, which will cover an area of 50 x 80 feet, the estimated cost to be $80,000. The plant will be equipped with engines of 1000 horse-power.

The South Side Elevated Railroad will increase its plant at Fortieth and State streets, Chicago, plans having been prepared by Sargent & Lundy. The addition will cover an area of 41 x 120 feet, of brick construction, at a cost of $25,000. No estimate has been given as to the amount to be expended on equipment.

Armour & Co., Chicago, will erect a two-story brick power house on Pitney court. The building will be of pressed brick, stone and steel construction, 78 x 173 feet, and will cost $25,000. The latest type of improved machinery will be installed.

Engines, Boilers and Pumps.

The Allis-Chalmers Company, Chicago and Milwaukee, note that the month of June has been less productive of orders for large engine units, but quite a number of contracts have been taken for small units. A great deal of new business is coming up, both East and West, for large and small units, in the electrical field and in general generating lines. Some very large orders have also been taken for cement plant equipments, one especially large one in Chicago. The demand for mining machinery has shown some falling off, and yet there has been no dearth of business. Since the large orders for flour mill equipment which have been reported business in this line has been confined to a considerable extent to small plants. It has been noted within the past six weeks that keener competition is encountered for orders for small engines, and a disposition to figure much lower than is necessary or seems warranted by general conditions. As has been previously stated, this company have orders on their books sufficient to keep all plants busy a full year from date without receipt of new business of any kind, and the business in sight seems to insure the employment of full capacity for almost a like period. Railroads and steel plants have notably been the largest buyers for many months, and are still the most important factors in the market, but it is notable that there is considerable work in sight outside of these two interests. Press reports have recently announced that the funds which were to be utilized in improvements at Chicago would be expended at Milwaukee. This is erroneous, and it is stated officially that the improvements at Chicago for which money was appropriated have to do only with the Chicago plants, and therefore when this action was reconsidered the incident was ended. There is no intention of making improvements at Chicago at the present time, but about $175,000 is being expended at the Dickson Works, Scranton, Pa. It is further probable that if extensions are made to any of the plants with a view to taking in new lines Milwaukee will receive preference over Chicago for obvious reasons.

The Nordberg Mfg. Company, Milwaukee, Wis., say that while there is a report of a slackening of business in some lines, especially in the eastern section of the country, they are having more inquiries by mail, and through personal visits by engineers in charge of enterprises of considerable magnitude, than they have had for some time. This business comes more especially from copper and iron mining companies, workers of copper and brass and iron rolling mills.

The Otto Gas Engine Company, Chicago, while recognizing that there is a general tendency to a decrease in business, report that they have enough work booked to keep them busy for the remainder of the year, without any new orders. Most of this business has come from railroads for isolated plants of either water or coal and largely in the Southwest, especially in Texas, Oklahoma and Indian Territory, but renewals are being placed in the West by the older lines to a considerable amount. Work in Kansas, Missouri and Nebraska has been suspended somewhat because of the damage occasioned by recent floods, much difficulty being experienced in obtaining material for pushing work. The outlook seems to be especially encouraging for additional business of this character. The tendency of lower prices for raw material, however, is alluded to by some buyers as a cause for delaying purchasing, as they anticipate lower prices for manufactured articles.

The Union Steam Pump Company, Battle Creek, Mich., report that their expectations for a 40 to 50 per cent. increase in this year's business are not now likely of fulfillment, although their business is still very good, and sales during the past month were greater than during June, 1902. Among the notable installations being made by this company are some large pumps for the Washington State Sugar Company, Spokane, Wash., a large jet condenser for the Detroit Stove Works and the partial equipment of the new paper mills at Kalamazoo, Mich. They report that foreign trade seems to be shifting to lines that approximate a level of prices between the American export prices and the foreign home prices, but their foreign trade is very favorable.

The Ætna Foundry & Machine Company, Springfield, Ill., say that orders seem plentiful, but buyers are looking for lower prices, and though the manufacturer may get some

concessions as to raw material, he is still obliged to pay too much for labor, which about evens up matters. The company have just completed the addition to their machine shop and do not contemplate any further improvements this year; in fact, they curtailed somewhat on the extent of the improvements just completed, owing to the high price of material and labor.

The Camp Engineering Company, Chicago, note that there is a continued active inquiry for second-hand engines, but the inquiries do not lead to business of magnitude. The increase comes largely from electric railroads and electric light power stations, and some engines have been sold to these interests as well as to rock crushing works.

The Quincy Engine Works, Quincy, Ill., state that owing to the fact that the Machinists' Union has been conducting a strike against their plant for nearly 12 weeks they are not in a position to compare the business of the month of June with the corresponding month of a year ago in volume of shipments and new sales. Business for their output does not seem to be coming from any special section of the country or from any special class of industries. They are, however, having a great deal of success with their four-plunger motor driven pump, which has recently been placed on the market. The company do not contemplate making additional improvements or installing new equipment other than that which has been ordered for some months, having even abandoned the addition to their foundry which was planned to be built during this season.

Power Transmission.

Pawling & Harnischfeger of Milwaukee report that, predicating their opinion upon the generally good business conditions of the last six months, and as they exist at this time they are not apprehensive of any material change. There appears to be no let up in the demand, and they believe the volume of business to be contracted for during the remaining six months of the year will be large and possibly equal to the six months past. They contemplate making extensive improvements in the way of an entire new plant, which will be located on National avenue near the city limits. The details of the new plant are not completed, but it is expected that operations will commence at no very distant date. The month that has just closed has been generally satisfactory, among the orders entered being the following: Pittsburgh & Montana Copper Company, Butte, Mont.; Chapman Valve Mfg. Company, Indian Orchard, Mass.; Pratt & Letchworth Company, Buffalo; New York Edison Company, New York City; Metropolitan Street Railway Company, Kansas City, two specials; A. & F. Brown Company, Elizabethport, N. J.; Standard Oil Company of New York; Atlas Works, Buffalo, two cranes; Kelly & Jones Company, Greensburg, Pa., two cranes; Standard Steel Works, Burnham, Pa.; Allis-Chalmers Company; Gates Works, Chicago; Edward Ford Plate Glass Company, Toledo; Ingersoll-Sergeant Drill Company, Easton, Pa., four wall cranes and one double extension crane; Lobdell Car Wheel Company, Wilmington, Del.; Atlantic, Gulf & Pacific Company, San Francisco; Gisholt Machine Company, Madison, Wis.; Singer Mfg. Company, Elizabethport, N. J.; S. M. Jones Company, Toledo, two cranes; McConway & Torley Company, Pittsburgh.

The Industrial Works, Bay City, Mich., report that business with them continues about the same as for some time past. Their capacity is filled for several months ahead.

The Northern Electrical Mfg. Company, Madison, Wis., say that the outlook for business is good. Among the orders now in their shops is one providing for the electrical equipment of the Kalamazoo Paper Company, Kalamazoo, Mich., which includes two 150 kw. and one 40 kw. generators, and two 40, one 25, three 10 and five 7½ horse-power motors. A recent shipment included a 150 and a 40 kw. generators, and two 10, 26, 7½, three 5 and one 2 horse-power motors for a prominent Michigan food company, who are operating their plant by electricity. The company are just completing an extensive addition to their erection floor and machine shop.

The Stephens-Adamson Mfg. Company, Chicago and Aurora, Ill., say that they have 50 per cent. more business on their books this month than they had a year ago. This work consists of recent contracts that they have taken for equipments of power transmitting machinery, elevating and conveying machinery that will be required in the States of Mississippi, Arkansas and Tennessee; grain elevators in St. Louis, Minneapolis and Canadian points, and cement mills in the East. Current orders during the months of May and June have been better than a year ago. The company report that, although the present season promises to be a most satisfactory one in every way, they will await developments before making any additions or plans for extension to their plant.

The Link-Belt Machinery Company, Chicago, report that the very satisfactory condition of their business shows no abatement, and, judging from contracts already made and those in prospect, the company's output will be limited only by the capacity of their plant. They have just completed important additions to their equipment, and do not contemplate any further improvements in the near future. They report that both in new orders taken and in the output of their plant the month of June has been in excess of any previous June in their history.

Special Machinery.

The Holthoff Machinery Company, Cudahy, Wis., say that the outlook is very bright. They have plenty of inquiries, and the work on hand will keep them busy two or three months, working at full and overtime. They contemtemplate adding some new equipment to their machine shop at an early day, being obliged to do this in order to properly take care of orders.

The Vilter Mfg. Company, Milwaukee, Wis., say that they have in the past four weeks closed a great deal of new business, which will keep them busy for a number of months. They are also figuring on considerable business, some of which they expect will be contracted for in the near future. The bulk of their orders are for ice plants, the larger number being destined for the East, while some are for the South. They report sales during June as considerably in excess of those of the same month last year, and also of the preceding several years. They do not contemplate making any particular improvements or installing new equipment in the near future.

The Stover Mfg. Company, Freeport, Ill., say that the continued wet and cold weather is proving very detrimental to the sale of wind mills, and has so retarded the growth of crops that farmers in many sections are discouraged and are buying no more machinery than they absolutely need. Their foreign trade is on the increase, being much larger this year than heretofore, but the general volume of their business is considerably less than a year ago, with not very encouraging prospects for an immediate improvement.

The Hoefer Mfg. Company, Freeport, Ill., have been affected to a considerable extent by labor troubles, and business with them during June has been very quiet.

Barnard & Leas, Moline, Ill., say that the business outlook is very fair, but at present they are experiencing considerable trouble from labor.

Machine Tools.

The B. F. Barnes Company, Rockford, Ill., say that business during June, as compared with that of June last year, shows up very favorably both as to volume of shipments and new sales. In the line of foreign trade nothing specially interesting has developed during the month, although they have booked several nice orders for export. The outlook for fall trade is very good, and even at the present time the company are behind 60 days on the filling of orders.

Hill, Clarke & Co., Chicago, while expressing the belief that both shipments and sales of machine tools have been smaller during June than during the month of May, and relatively less than a year ago, supplement this statement with the fact that they have received some very unexpectedly large sized orders for full equipments within the past two weeks which have carried the volume of business to a specially satisfactory point. They note a specially good inquiry for electrical driven tools. Collections have been unusually poor, and yet in the face of this general report 75 per cent. of the sales made in the past few weeks have been for cash, which, as they say, is a seeming inconsistency. Some orders have come from St. Louis during the past few days.

The Fox Machine Company, Grand Rapids, Mich., report that domestic business in territories affected by strikes has fallen off very much, although notwithstanding this fact it compares favorably with last year; if anything, showing a substantial increase. The company anticipate a settlement of labor troubles and a good fall business. Foreign business continues very satisfactory.

Williams, White & Co., Moline, Ill., have found business somewhat lighter this spring than last year; but within the last two or three weeks they have had quite a number of orders coming in.

McDowell, Stocker & Co., Chicago, report a further material falling off in the volume of business during the month of June as compared with the previous month and the corresponding month a year ago. Labor agitation and anticipation of lower prices are cited as the probable causes for the light buying manufacturers. The railroad companies, however, have continued to be fair purchasers, and some desirable orders of this character have been taken during the month. The outlook as reflected from salesmen's reports and mail advices from consumers is not specially encouraging. Collections are unusually difficult to make, even some large companies failing to meet contract payments recently.

The J. H. Dawson Machinery Company, Chicago, report sales during the month of June as showing a decided falling off in nearly all lines, which they attribute not only to labor troubles, but to the general belief in lower prices. Consumers are at least satisfied that there will be no advance if no decline, and hence are disposed to hold off from purchasing. Sales a year ago at this time were from two to three times the present volume, and the outlook for new business in the immediate future is unusually poor. Reports from manufacturers, however, seem to indictate that there is no prospect for any decline in prices, as any reduction in the

cost of material is more than offset by the increased wages paid to labor.

Tools and Supplies.

The Bignall & Keeler Mfg. Company, Edwardsville, Ill., say that there has been no noticeable cessation of orders during the past months. They have orders booked which will keep their shop running full handed during the months of July and August, with the usual number of inquiries coming in. Their sales during the month of June were nearly double those of June last year. During the past two months the company have booked orders for 15 machines to be shipped to California, and have taken an order for one machine for England.

The Chicago Pneumatic Tool Company, Chicago, say that during the past month they received orders for pneumatic appliances of every description, no one kind seeming to be more in demand than another. The business, too, did not come from any special section of the United States, but was well distributed over the entire country. They report orders received during June 50 per cent. in excess of those taken during the same month of last year. Their foreign offices report a proportionately prosperous month, and state that pneumatic appliances are becoming more and more firmly established in the old countries, taxing facilities to the utmost to fulfill requirements. The company have installed a considerable amount of equipment in their Cleveland plant. They have a'so recently enlarged their general offices in the Fisher Building, Chicago, by the addition of several rooms.

The Novelty Iron Works, Dubuque, Iowa, advise that business for June this year is not as good as it was at this time a year ago. Trade is better in the Southern States than elsewhere. They do not contemplate making any additional improvements, as their present equipment is sufficient for all probable future demands. They think business will improve when raw material becomes permanently lower in price.

The Ransom Mfg. Company, Oshkosh, Wis., report that they have found June a much better month than May, and larger than June of a year ago. They are looking forward to a heavier fall trade than was the case in 1902. During the past month or two they have had a heavy call for disk grinders, both motor and belt driven.

The Scully Steel & Iron Company, Chicago, report a very good demand for small tools, especially pneumatic, the demand coming largely from structural iron and boiler works. Quite a number of small orders, which in the aggregate are quite considerable, have been booked in the West. They note that the demand from the Pacific Coast and Northwest for heavy tools has increased of late, and they have made some shipments to Canadian points for small tools to be used in constructing railroad stand pipes destined for the Canadian northwest. They have also taken several orders for shipment to Ohio, Indiana and nearby points during the past few weeks. They report a general disposition among small manufacturers to be especially conservative in the placing of orders, attributing this fact to the general belief in lower prices for machinery based upon lower prices for pig iron and steel billets.

The D. Clint Prescott Company, Menominee, Mich., say that their business is increasing all the time, and they have more contracts already booked and business in sight then ever before.

The American Machinery Company, Grand Rapids, Mich., say that July and August are usually dull months compared with the balance of the year, and present conditions do not indicate that this year will be an exception to the rule, although early settlement of some of the labor troubles may result in the placing of delayed orders at an early day. The company have, however, a large number of unfilled orders, which, with some prospective contracts, will keep their capacity fully employed for some time. In number the orders received during June compare favorably with the same month a year ago, but in average amount the orders taken during the past month were considerably larger than in June, 1902. The demand comes from all sections of the country, although a larger proportion than usual has come from Canada during the past month. The company report trade in Great Britain very good, with prospects brighter there than they were a few months ago. With the exception of the installation of a number of machines, which have already been contracted for, the company do not contemplate any further additions to their equipment in the near future.

The Anderson Tool Company, Anderson, Ind., report that business in all departments is fair. While they are doing a satisfactory business, the volume was not as great for June as it was for April and May.

The Whitehead Machinery Company, Davenport, Iowa, report a continuation of the general conditions which prevailed in May. They consider the prospects for future business very good.

The Waltham Emery Wheel Company. — The Waltham Emery Wheel Company of Waltham, Mass., deny the report that they have purchased any land in Worcester, Mass., to build a new plant or moving from the present location. They state that their present plant is very satisfactory.

The E. J. Manville Machine Company.

WATERBURY, CONN., June 30, 1903.—The E. J. Manville Machine Company of Waterbury, Conn., have bought a large tract of land in that city and are to erect large shops on the premises. The land is located at the East End at the corner of East Main and Dublin streets, just east of the plant of the Scoville Mfg. Company, and close to the Dublin street station tracks. Mad River touches the property, which contains 2 acres. Work on the new buildings will begin as soon as possible this season, and it is the expectation of the company to get into their new quarters early in 1904. Five buildings will be erected. A three-story brick building, 40 x 120 feet, will contain the offices and a machinery showroom on the first floor and the engineering and drafting department on the second floor. The pattern shop will also be in this building. The basement will contain the workmen's dressing room and washroom, and a reading room for employees. A fire proof vault will provide safe storage for drawings and other valuable records. The machine shop building will be 50 x 320 feet, with two stories and a basement. The main shop will be 16 feet high and will be equipped with two heavy traveling cranes which will cover the building from end to end. The boiler house, engine room and blacksmith shop will be in separate buildings at the rear of the main buildings. Everything in the new shops will be of the most modern type. Electric power and lighting will be installed, though the details of this part of the plan have not been perfected. The new shops have been under consideration for some time. It became a question as to whether the business would remain in Waterbury or be moved to Bridgeport, but after carefully weighing the matter it was decided to remain in Waterbury. Every plan has been made with careful deliberation, and the result is that the company will have just what they want in the way of shops. Their present quarters are outgrown and doubtless the business will materially increase as soon as increased facilities of manufacture are in readiness. The E. J. Manville Machine Company make specialties of wire working machinery, rivet and screw blank machinery, screw slotting machinery, thread rolling machinery, eyelet machinery and power presses. The present shops consist of the three-story brick building on Meadow street, which they own, and a part of the Holmes Building, which they rent. The officers of the company are: President and manager, M. H. Brennan; treasurer, D. T. Hart, and secretary and superintendent, A. C. Campbell.

The United States Steam Turbine Company.—NEW LONDON, CONN., June 30, 1903.—The United States Steam Turbine Company have plans completed for a plant at New London, to manufacture turbine engines under patent rights issued to E. C. Terry of Hartford, Conn. The building planned for the beginning of the business will be 100 x 150 feet, of brick, arranged with a gallery on each side 35 feet wide and extending the length of the building. The shop will be equipped with a 30-ton traveling crane, which will cover the main floor under the central span, 30 feet wide. The plans call for the ultimate extension of the building until it will be 400 feet long by 100 feet wide, and there will be room for another building parallel to it. These are the plans as announced by the promoter of the enterprise, E. C. Crocker of North Adams, Mass. The company have been incorporated under the laws of New Jersey with an authorized capital stock of $300,000. The officers are: President, Sidney H. Miner; vice-president and general manager, E. C. Crocker; secretary, A. H. Wadsworth; treasurer, Kirk H. Pierce; directors, these officers and E. A. Summerville. Mr. Crocker states that the turbine to be manufactured is very similar to the Curtis type and is for stationary engine purposes.

HARDWARE.

THE phrase, "American Invasion," expressing the manner in which our manufactured products are taking possession of foreign markets, is not entirely appropriate, as it suggests a sudden and violent effort rather than the gradual development and growth of the foreign demand for goods which have been quietly winning their way on their merits, price, quality and general adaptation, making a successful appeal to the trade and to the public. While there has recently been a more open and aggressive effort on the part of some of our manufacturers to secure the world's trade, the extent which it has attained is very largely the natural result of former efforts, unobtrusive and for a time attended with only moderate success. The years of patient cultivation of foreign commercial markets are thus yielding a gratifying return in the way of substantial and largely increased orders, notably in lines most intimately connected with labor saving machinery and up to date methods of manufacture.

This view of the situation is emphasized by late Treasury customs figures of exports and imports, which show satisfactory gains in most lines, notwithstanding the unexampled home demand of the last few years and the greatest total of importations for a year in the history of the country, the latter exceeding $1,000,000,000; the increase, however, being largely in raw materials for manufactures and thus reflecting an exceedingly satisfactory condition of home production and trade. The losses in exports of manufactures have been comparatively slight since the record year ending June 30, 1900, when the total was $433,851,756, followed by $410,932,524 in 1901 and $403,641,401 in 1902. An examination of the figures shows gains in many classes of Hardware and metal goods, the relatively small losses being in the heavier and coarser products. Among the lines in which notable gains are reported are Builders' Hardware, Tools, Firearms, Cash Registers, Nails and Spikes, Pumps and Pumping Machinery, Pipes and Fittings, Scales and Balances, Stoves and Ranges, Laundry Machinery, Sewing Machines, Safes and especially Agricultural Implements. In some of these the gains have been impressive, while existing conditions point to a further steady increase in business.

What has been accomplished and the very gratifying prospect for further development should encourage manufacturers of metal and allied goods, as well as those in other lines, to endeavor unremittingly wherever and whenever occasion offers to bring their goods to the attention of foreign buyers. In connection with this effort there must be, of course, a readiness to adapt the goods to the requirements or even the prejudices of foreigners. In this cultivation of distant fields, all of which are characterized by conditions very different from those prevailing in this country, no medium equals in efficiency the trained representative brought up in the manufacture or sale of the goods, competent to commend them to the trade and capable of explaining their merits and replying to hostile criticisms. There are, however, many methods less expensive which can be adopted with advantage and will result in establishing foreign connections of growing importance. The manufacturer, however, who is looking for foreign business must not expect any great returns at the outset, but in accordance with the experience of the past must be satisfied with a slow and steady development, which if the goods are adapted to the markets in which it is sought to place them will amply justify the labor and expense of introducing them.

Condition of Trade.

An excellent idea of the feeling in the various trade centers may be gathered from the advices which are given in the following columns, which represent the manner in which the business outlook is regarded by our correspondents. It is generally recognized that there is a temporary halt in the movement of business, so far as the supply of the larger distributers is concerned, and manufacturers, although behind their orders, find that they are able to turn out goods much faster than orders are at the present time coming in to them. This experience, while conceded to possess some advantages in the relaxation of a too intense pressure, is not altogether to their liking. It would be more comfortable for them to have their order books filled months in advance, as has been the case for so long, than to have their confidence based upon the prospects for business, even though exceedingly promising. Some of them indeed seem to feel, so far as their immediate comfort is concerned, that one order in July is worth two in the fall. It is notable that a hopeful feeling in regard to the character of business during the remainder of the year prevails generally throughout the trade, but perhaps in a more marked degree in the West than in the East. The strikes which are in effect in many cities, especially in the building trades, have a depressing influence and interfere considerably with the volume of current business. In view of the diversity of conditions and the exceptional character of influences by which the crops are affected, it is more difficult than usual at this season to form a definite estimate as to what the final outcome will be. The indications, however, fortunately point to a good, if not a large harvest. The vacation season upon which the trade are now entering is naturally having some effect upon business, and after the heavy pressure of the past six months it is obviously the part of wisdom for manufacturers and merchants to seek the relaxation which is the appropriate recognition of past labor, as well as a preparation for the successful conduct of business in the future.

Chicago

(By Telegraph.)

The large Wire mills in this section report the receipt of continued liberal orders from manufacturers for Weaving Wire, for Fencing Wire, for Springs of various kinds for upholstering purposes, including mattresses, car seats, &c. Shafting, Screw stock and similar goods are liberally ordered. The demand from jobbers, however, for Nails and Barbed Wire is now at a low ebb, the dull season of the year having been reached when mills will accumulate stock for shipment in the fall. Aggreate sales by the largest interest, however, show that tonnage sold still running a little ahead of a year ago. This interest has recently addressed a circular letter to the trade throughout the United States, and a large majority of the answers have been received, indicating a favorable opinion of the business outlook for the fall and winter, based upon crop prospects and a settlement of labor difficulties. A very good demand has been experienced for Wire Rods, some sales having been made aggregating about 10,000 tons in the last ten days all on the basis of $36, Pittsburgh. Manufacturers also report an increased demand for Washers, Railroad Spikes, Bolts and Nuts. But trade in Sheets and Tin Plate has fallen off considerably, as expected at this season; but some contracts are being taken for future delivery, and shipments on old orders are now being made with greater facility. Manufacturers' agents for Shelf Hardware report an excellent trade. Some orders have been received from Louisville, Indianapolis and Detroit, but there has been little improvement in the city of Chicago. There has also been a fair run of small orders for Builders' Hardware, some good sized orders having recently been

received from Indianapolis for the furnishing of apartment houses. The contract for furnishing the Iroquois Theatre at Chicago has been placed with local dealers, and it is understood that the goods, which will be of special design, will be furnished by an Eastern manufacturer. Some further orders of moment have been recently placed by manufacturers' agents for Leather Goods, such as Soles and Tapes, with local jobbers. There are many complaints from agents, however, that trade is not what it should be in specialties, and the jobbing trade continues to show some falling off. One feature of interest during the week has been a renewal of the demand for Hay Forks, Snaths and Scythes, reflecting the tenor of reports concerning the harvesting of a very heavy hay crop west of the Mississippi River. Renewal orders have also been received for other Steel goods to a surprising extent. Lawn Mowers have contined to prove one of the best staple selling articles at this season. A few late orders are being received for fall goods, such as Axes, Lanterns and Scoops, and some jobbers are placing orders for Cutlery for fall delivery. It is reported that the large jobbers of Chicago and St. Louis that canvass the district west of the Mississippi thoroughly have withdrawn their agents from the flood visited sections and have doubled their representatives in other sections, cultivating the other territory much more thoroughly than usual. A new schedule of prices is reported for Bright Wire Goods. Otherwise no changes of any importance—that is, as far as prices are concerned—have been announced. The weakness developed in Copper and Spelter, however, may have an influence on manufactured goods later in the season. The Pig Iron market has continued to sag, and even lower prices are anticipated. Hence, there is a natural tendency for manufacturers to hold off from purchasing and consumers of manufactured goods are disposed to wait for further developments. There is a settled conviction that there will be no advance in manufactured goods and there is even a possibility of lower prices, although most manufacturers state that whatever advantage may accrue from the lower prices of material is more than compensated for by the increased cost of labor.

St. Louis.

(*By Telegraph.*)

Trade conditions continue very favorable and the outlook for the fall is said to be most excellent. The prices, it is said, are being well maintained by all of the houses and collections are good. Some buyers, whose custom it has been to purchase all their requirements in this market, have diverted some of their trade to other centers, being fearful that the strikes and floods which this market has had to contend with would seriously affect the delivery of goods. The fact can now be emphasized that there is no occasion for dealers diverting any of their orders from this market, as the jobbing interests can assure prompt deliveries. It was said to our representative by the head of one of the largest jobbing houses that, notwithstanding the floods and strikes of this season, the actual figures from their books show a substantial increase over 1902 .

Boston.

Bigelow & Dowse Company.—After a 50 days' drought New England has been deluged for the past three weeks. This cold, wet weather has seriously interfered with the comfort of the early visitors at the seashore and country resorts, and has kept many away. The bright sunshine of the past few days is bringing with it countless visitors, as indicated by the piles of baggage being transported across the city.

It is claimed over 15,000 Christian Scientists attended services here yesterday (Sunday), it being their annual pilgrimage to the mother church. Six trainloads, carrying 6000 people, have gone to-day (Monday) to visit Mother Eddy at her home in Concord. Next week our city is preparing to receive 30,000 teachers, coming from all parts of the country.

It is important to note this great inflow, as New England summer resorts are so dependent on a liberal patronage that it means large gains or great loss to a large community of interests.

The dry weather brought great forest fires, entailing losses of millions of dollars. The streams were dry and the logs could not be moved until great floods came suddenly, breaking the booms and scattering them broadcast. The hay crop suffered badly, and so did the early fruit and vegetables. It is a question what the excessive rain and cold weather will do to reclaim the losses from the early drought.

Conditions are so unusual it is a hard problem to solve the final result of these climatic changes. Like other sections, the restlessness of labor has injured the builders' plans and demoralized the expected sales of Builders' Hardware. The threatened strikes in the building trades were mostly settled by arbitration, so they have not been general, but the fear of them has paralyzed all new plans. The retail dealers have done well in the sale of Hardware for the household and the farm, but are disappointed in the builders' line. The sales of Bicycles and Bicycle Sundries have been better than last year. Orders booked for fall goods for future delivery are quite up to those of former years. Prices have been firm all the spring, and there are few indications of any weakening until manufacturers have a chance to replenish their depleted stocks. While it is good business policy to keep a well assorted stock, it will not pay to speculate this fall.

Omaha.

Lee-Glass-Andreesen Hardware Company.—This market, including other jobbing centers located on the Missouri River, presents no new or particularly interesting features at the present time. Business in all lines is flourishing, and the volume of goods daily going into consumption continues with a steady regularity.

The prospects for a large yield of corn, wheat and small grains are very favorable indeed. Copious showers have been general throughout the corn belt, and reports received from nearly all sections are of a very encouraging character.

All accounts agree that the country tributary is in excellent condition, consequently the fall trade, to which jobbers are now looking forward with interest, will probably aggregate very satisfactory proportions. General conditions are regarded as excellent; labor is well employed and the outlook for the continuance of a heavy volume of business is about all that could be desired.

Nashville.

Gray & Dudley Hardware Company.—The beginning of the vacation season is now at hand, and a good many of the traveling salesmen are taking their annual summer holiday. Those that are on the road are doing a good business for this time of the year, and the number of orders being received is greater than usual for midsummer.

The crop conditions are extremely good, and the indications are that the crops in this section of the South will be somewhat above the average. Prices on most all lines are firm, and recent advances are being well maintained. The recent reduction in the price of pig iron has not affected the Hardware trade to any extent.

The credit men of the various jobbing houses in this city report collections up to the average and very satisfactory. In fact, we may state that the prospects are very flattering, and we look for a large business during the coming summer and fall months.

San Francisco.

Pacific Hardware & Steel Company.—While it is true that June sales show an increase over the same month of last year, the present indications are not as good for continued increases as they seemed some weeks back. Our crops will not be as heavy as we then anticipated.

Our whole country, however, is in a most prosperous condition, and improvements are being made in all directions, with many more in contemplation. All this alone does not account for the growing business, and we attribute much of the increase to the fact that our trade has learned the many advantages to the retailer in buying his goods from the source of quickest delivery. He has found that greater profits can be made by carrying as large an assortment as his means will permit, rather than by buying large quantities of single items to save a

small percentage. So it is that our Pacific Coast retailer is learning to patronize the dealer who carries a sufficient stock to insure him the promptest deliveries, which, in a large measure, accounts for the growing business of San Francisco.

Collections at this time of the year are frequently slow, awaiting the coming harvest. This year's payments are being made more promptly than in several years past.

Portland, Oregon

CORBETT, FAILING & ROBERTSON.—Trade holds in the same strong volume as heretofore reported. Crops as a whole bid fair to be an average and prices will probably be better than have ruled for a number of years past. Logging camps are closed for the last half of June and month of July, both for saw mills and shingle mills, with the hope of curtailing supply and maintaining the high prices prevailing of late. This is one of the bad features of consolidation that is to be copied after in all lines of business in the future—bad because it tends to benefit the few at the expense of the many, throwing out of employment the wage worker, who is ultimately the consumer, and destroying the purchasing power that the manufacturer must depend on to market his product. However, "Sufficient unto the day is the evil thereof." So we will cross this bridge when we come to it.

A disaster that overwhelmed the small town of Heppner, in Eastern Oregon, a little more than a week ago demonstrates clearly that all the world is akin. Portland has raised more than $20,000 for the sufferers and contributions have come from Tacoma, Spokane, San Francisco, New York, Philadelphia, and even from Texas, showing that neither mountains nor distance place restraint on charity and sympathy for the needy and suffering.

Cleveland.

THE W. BINGHAM COMPANY.—We have nothing special to report from Cleveland at the present time except that all the Hardware jobbers here report a good, steady business in all lines that they handle or represent. The copious showers that have visited some sections of country that are tributary to Cleveland have had no bad effect upon the trade. Country merchants, while their stocks are fairly well assorted, seem to be having a good, steady trade and are sending good sized and well assorted orders. Those of us who keep track of the number of orders handled each month can certify that the number of orders handled the first six months of this year will far exceed the number handled in the past two years for the same time. This also shows a good healthy trade.

If published statistics are true (and they seem to be authentic) it would seem we need not be afraid of overproduction in this country for some time to come, as evidence of continued prosperity of the United States is furnished by the figures of the United States Treasury Bureau of Statistics, which show that the foreign commerce of this country during the fiscal year which will end June 30 is the largest in its history, showing a good balance in favor of exports over imports.

The immense grain crop in the West we think is going to cut quite a figure with all business. It is said that the crop of wheat in Kansas alone is so large that it will require 28,000 outside harvest hands to gather in this year's crop. All of these statistics go to prove quite conclusively that we can all look for a good and steady trade the balance of the year.

Vacation season is at hand and, as usual, quite a number of traveling salesmen will be off their trips for a short time recuperating and getting themselves in first-class shape to tackle the fall trade. During this time we expect a large mail order trade.

Our advice to our customers who have placed orders for future shipment of fall goods is to allow us to send them forward at our option rather than ask us to hold them until some specified future date, for there does not seem to be an overstock of goods in the hands of the manufacturers, and it would seem to us advisable to take the goods in stock as fast as they can get them rather than wait for some specified future time and perhaps not be as well served. The manufacturers in the Iron and Hardware line here all report they are busy and are booking a large number of orders for immediate and fall shipment. The steel situation is usually taken as the trade barometer, and as prices have been fixed for Steel Rails and other heavy kinds of steel products for 1904, it augurs well for next year's trade. It is said that Pig Iron production has never been heavier in the United States than at the present time, and yet the entire supply is taken as quickly as produced. Stock piles are being depleted. On the whole, trade in this section is in a healthy state.

Baltimore.

CARLIN & FULTON.—June and July have never been considered in this section very active business months except for goods classed as summer necessities. The Fly Fan and the Hammock, the Freezer and the Refrigerator have had the call. In the agricultural section the wheat harvest is now going on, except when interfered with by the showers occurring every day. Vacations are also in order.

The market has continued very firm in spite of the fact that it is midsummer, and we see no evidences of any accumulation of goods by manufacturers and consequently no necessity for lower quotations. Every element of cost in goods, whether raw material, labor or transportation, seems to favor a continued firm market, and if the purchasing power of the country is not diminished by injury to the growing crops we should have another year of good business in every section. The fluctuations of the stock market happily do not represent the conditions of the mercantile and manufacturing interests, which are on a very different basis, as shown by the published statistics from time to time of the net earnings of the great transportation lines of the country, and also of both imports and exports as given by the Government.

NOTES ON PRICES.

Wire Nails.—Demand is of fair volume, but limited in comparison with the amount of business being handled by the mills earlier in the season. No doubt labor strikes have recently had a marked effect upon the consumption of Nails. Quotations are as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days:

Jobbers, carload lots	$2.00
Retailers, carload lots	2.05
Retailers, less than carload lots	2.15

New York.—In the local market business for June has exceeded the expectations of jobbers, in view of the unsettled condition of labor and consequent reduction in building operations. The market is firm at the following quotations: Single carloads, $2.20; small lots from store, $2.25 to $2.30.

Chicago, by Telegraph.—There is a fair amount of new business coming from the Southwest, but as a rule the tendency is toward a decrease in new business, and manufacturers expect to accumulate considerable stock during the next two months preparatory to filling orders for the fall trade, which is expected to be quite liberal, the crop outlook being good and labor conditions being settled. The jobbing trade has been only moderate and as a rule prices have been well sustained. Quotations continue at $2.15 to $2.20 in carload lots, f.o.b. Chicago. Broken cars sell at 5 to 10 cents higher. For galvanizing 75 cents per keg and for tinning $1.50 extra per keg is charged.

St. Louis, by Telegraph.—Jobbers continue to quote $2.35 for Wire Nails in small lots from store and report demand of light order.

Pittsburgh.—Demand for Wire Nails is light, due to the fact that the season is pretty well over and also to the strikes in the building trades. Specifications on contracts are coming in at a fairly satisfactory rate and the tone of the market is firm. We quote $2 in carloads to jobbers, $2.05 in carloads to retailers and $2.15 in small lots, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days. For galvanizing Nails 75 cents per keg is charged and for tinning Nails $1.50 per keg extra.

Cut Nails.—Prices ruling in June were reaffirmed for the month of July by the Cut Nail Association at their meeting last week. The market continues in a normal condition, with no new developments. The market is

firm and quotations are as follows: $2.15, base, in carloads and $2.20 in less than carloads, f.o.b. Pittsburgh, plus freight in Tube Rate Book to point of destination; terms 60 days, less 2 per cent. off in 10 days.

New York.—A moderate demand exists in the local market, which is all that could be expected in view of the restricted amount of building which is going on. The market remains firm and quotations for carloads and less than carloads are as follows: Carloads on dock, $2.29; less than carloads on dock, $2.33; small lots from store, $2.40.

Chicago, by Telegraph.—The market has remained very quiet, and the few orders received for prompt shipment are readily filled. The market remains firm, however, as previously quoted on the basis of $2.30 in carload lots and $2.35 in less than carload lots for Steel, Chicago; Iron Nails are held at $2.45 to $2.50 per keg from store.

St. Louis, by Telegraph.—Conditions are steady in this department of the market, with fair amount of demand and inquiry coming to hand. In small lots from store Steel are quoted at $2.40 and Iron at $2.55.

Pittsburgh.—June prices of Cut Nails have been reaffirmed for July delivery. There is a fair demand and the mills are making prompt shipments. We quote Steel Cut Nails, $2.15, base, in carloads and $2.20 in less than carloads; Iron Cut Nails, $2.25, base, in carloads and $2.30 in less than carloads, plus freight in Tube Rate Book to point of destination, 60 days, less 2 per cent. off in 10 days.

Barb Wire.—The requirements of the trade are met by a limited amount of new business and specifications on old contracts. The output of the mills is reported to be equal to, if not exceeding, the corresponding period of last year. Quotations are as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days:

	Painted.	Galv.
Jobbers, carload lots	$2.30	$2.60
Retailers, carload lots	2.35	2.65
Retailers, less than carload lots	2.45	2.75

Chicago, by Telegraph.—There has been a fair movement on old contracts, but there is a steady falling off in the amount of new business received, as usual at this season. During July and August it is anticipated that the mills will be able to accumulate stocks, so that prompt shipments can be made early in the fall. The outlook for trade based upon crop returns and other business conditions in the West and Southwest is considered bright. The market remains firm in tone, prices being without essential change. Galvanized Wire is selling on the basis of $2.75 to $2.80 in carload lots and Painted at $2.45 to $2.50, the outside price being to retailers. For small lots 5 to 10 cents extra is charged. Staples in carload lots sell as follows: Polished, $2.30 to $2.35, and Galvanized, $2.70 to $2.75, the outside price being to retailers.

St. Louis, by Telegraph.—The market shows firmness, with the volume of transactions of a fair order. In small lots from store Painted is quoted at $2.65 and Galvanized at $2.95.

Pittsburgh.—Very little new business is being placed, the mills running on old contracts. There is no change in prices, which are firm, as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days: Painted, $2.30; Galvanized, $2.60, in carloads to jobbers; Painted, $2.35; Galvanized, $2.65, in carloads to retailers; Painted, $2.45; Galvanized, $2.75, in small lots to retailers.

Smooth Fence Wire.—The mills are fully employed filling new orders and shipping specifications on existing contracts. Quotations are as follows, f.o.b. Pittsburgh, terms 60 days, or 2 per cent. discount for cash in 10 days:

Jobbers, carloads	$1.90
Retailers, carloads	1.95
Less than carloads	2.05

The above prices are for base numbers, 6 to 9. The other numbers of Plain and Galvanized Wire take the usual advances, as follows:

	6 to 9	10	11	12&12½	13	14	15	16
Annealed	Base.	$0.05	.10	.15	.25	.35	.45	.55
Galvanized	$0.30	.35	.40	.45	.55	.65	1.05	1.15

Chicago, by Telegraph.—The demand for Fence Wire and Wire Fencing continues quite active, and the mills are still having much difficulty in filling contracts promptly. If this condition continues there will be little chance of accumulation of stocks during the summer for the fall and winter trade. Under the circumstances a strong tone prevails, with no change in prices, which are as follows: Nos. 6 to 9, $2.05 to $2.10 in carload lots on track, and $2.15 to $2.20 in les than carload lots from store; Galvanized, 30 cents extra for Nos. 6 to 14 and 60 cents extra for Nos. 15 and 16.

St. Louis, by Telegraph.—Demand is moderate and prices hold firm. Jobbers quote No. 9 at $2.30 and Galvanized at $2.60.

Pittsburgh.—There is a continued good demand, which with old contracts placed some time since keeps the mills well filled up. Prices are firm, but without change, and are as follows: Plain Wire, $1.90, base, for Nos. 6 to 9 in carloads to jobbers, $1.95 in carloads to retailers and $2.05 in small lots to retailers; Galvanized, 30 cents extra for Nos. 6 to 14 and 60 cents extra for Nos. 15 and 16.

Bright Wire Goods.—Under date of June 24 the associated manufacturers of Bright Wire Goods adopted revised list prices which are given below. This action was taken to correct inequalities in the former list, and also to embody a moderate advance without changing current discounts. The list which follows is that of Sargent & Co., with which the lists of the other manufacturers agree. The revised list is subject to a discount to the general trade of from 85 to 85 and 10 per cent.:

BRIGHT WIRE GOODS.

Gate Hooks and Eyes.

40 Per gross.		1040 Per gross.	
1½	$6.00	1½	$21.00
2	7.50	2	27.00
2½	8.50	2½	34.00
3	10.00	3	46.00
3½	12.50	3½	58.00
4	13.50	4	61.50
4½	17.00	4½	76.00
5	20.00	5	82.00
5½	24.00	6	110.00
6	25.00	8	130.00
8	30.00	10	150.00
10	35.00	12	170.00
12	45.00	14	180.00
14	55.00	16	200.00
16	70.00		

Cornice Hooks.

30 Per gross.		35 Per gross.	
2	$9.00	2	$7.00
2½	10.00	2½	8.00
3	11.00	3	9.00
3½	12.00	3½	10.00
4	13.00	4	11.00
4½	14.00	4½	12.00
5	15.00	5	13.00
6	17.00	6	15.00
8	20.00	8	18.00
10	24.00	10	21.00

Plates for Cornice Hooks.
Per gross $2.70

Screw Eyes.

Per gross.		Per gross.	
0	$13.00	1004	$29.00
1	11.00	1005	23.00
2	8.50	1006	19.00
3	7.00	1007	15.50
4	5.50	1008	12.00
5	4.50	1009	10.00
6	3.50	1010	8.00
7	3.00	1011	6.50
8	2.50	1012	4.50
9	2.25	1013	3.50
10	2.00	1014	3.00
11	1.75		
12	1.50	1104	26.00
13	1.40	1105	21.00
14	1.30	1106	17.00
		1107	13.50
104	5.00	1108	10.00
105	4.00	1109	7.50
106	3.25	1110	6.50
107	2.75	1111	5.50
108	2.30	1112	4.00
109	2.00	1113	3.25
110	1.80	1114	3.00
111	1.60	1114½	3.00
112	1.40		
113	1.30	1204	24.00
114	1.20	1205	19.50
114½	1.20	1206	15.00
		1207	12.00
204	4.50	1208	9.00
205	3.50	1209	7.00
206	3.00	1210	6.00
207	2.50	1211	5.25
208	2.20	1212	3.75
209	1.90	1213	3.00
210	1.70	1214	3.00
211	1.40	1214½	3.00
212	1.30	2214	3.00
213	1.20		
214	1.10		
214½	1.10		
215½	1.10		

Stair Rod Eyes.

Per gross.		Per gross.	
408	$3.00	409	$4.00

Bird Cage Eyes.

Per gross.		Per gross.	
18	$4.20	1018	$15.00
218	3.20	1218	12.00

Short Shank Screw Eyes.

Per gross.		Per gross.	
106½	$3.25	112½	$1.40
107½	2.75	113½	1.30
108½	2.30	212½	1.30
109½	2.00	213½	1.20
110½	1.80	216½	1.10
111½	1.60		

Mosquito Bar Eyes.

Per gross.		Per gross.	
406	$7.20	426	$8.50
416	7.80	436	9.00

Screw Hooks.

Per gross.		Per gross.	
800	$18.00	709	$2.80
801	15.50	710	2.40
802	13.00	711	2.20
803	11.00	712	2.00
804	8.00	713	1.90
805	6.50	714	1.80
806	5.50		
806½	5.00	2703	11.00
807	4.00	2704	8.00
808	3.50	2705	6.50
809	2.80	2706	5.50
810	2.40	2707	4.00
811	2.20	2708	3.50
812	2.00	2709	2.80
813	1.90	2710	2.40
814	1.80		
		904	8.00
1804	42.00	905	6.50
1805	35.00	906	5.50
1806	29.00	907	4.00
1807	20.00	908	3.50
1808	15.00	909	2.80
1809	12.00	910	2.40
1810	9.50	911	2.20
1811	7.50	912	2.00
1812	5.50	913	1.90
1913	4.25	914	1.80
1814	3.25		
		1904	42.00
700	18.00	1905	35.00
701	15.50	1906	29.00
702	13.00	1907	20.00
703	11.00	1908	15.00
704	8.00	1909	12.00
705	6.50	1910	9.50
706	5.50	1911	7.50
706½	5.00	1912	5.50
707	4.00	1913	4.25
708	3.50	1914	3.25

Cup Hooks.

Per gross.		Per gross.	
600	$18.00	1600	$100.00
601	15.50	1601	82.50
602	13.00	1602	62.50
603	11.00	1603	46.00
604	8.00	1604	42.00
605	6.50	1605	35.00
606	5.50	1606	29.00
607	4.00	1607	20.00
608	3.50	1608	15.00
609	2.80	1609	12.00
610	2.40	1610	9.50
611	2.20	1611	7.50
612	2.00	1612	5.50
613	1.90	1613	4.25
614	1.80	1614	3.25

Axes.—The present condition of the Axe market, with its unprofitably low prices and general demoralization, is exceedingly unsatisfactory to the manufacturers. Some of them whose facilities are not of the best or who are indisposed to do business at a loss have practically closed their plants and are awaiting a more satisfactory state of things. With a view to correcting these unsatisfactory conditions the manufacturers have recently been conferring, for the purpose of devising some method by which it will be feasible for them to obtain remunerative prices. The negotiations are undertaken with a view to putting the market in shape for next year, as this year's business is practically over, with nine-tenths of the orders already placed. Very satisfactory progress has been made toward the carrying out of the plans, but until they are finally consummated it is recognized that there is a great deal of uncertainty as to what the result will be. Meanwhile the manufacturers have prudently withdrawn prices and are refusing to accept orders at the figures which have been current.

Binder Twine.—Eastern manufacturers, as a rule, have sold all they will make to August 1, and are not seeking new business. Prices on Sisal and Standard range from 12 to 13½ cents, according to buyer and quantity. Some manufacturers have refused to accept large orders at 12 cents. The view is expressed that the lateness of the season in this section will permit of enough Twine being made so that there will be no shortage. Navigation opened about two weeks earlier than usual this spring, and the demand for Rope at that time put manufacturers behind their orders. This, in addition to the difficulty of keeping a full force at work in Cordage works, has prevented an accumulation of Rope by manufacturers, so that they have not cared to go heavily into the manufacture of Twine. Under these circumstances prices are ruling higher than probably would be the case under usual conditions. The policy of the International Harvester Company in withholding the announcement of prices until April 1 probably deterred many jobbers from contracting for Twine as early as usual, as other manufacturers were generally waiting for a market price to be made by the largest producer. Reports from the West indicate that at present the most serious question is to promptly supply the Southwest with Twine. Delayed shipments have caused a temporary shortage in some localities. In Southern Illinois and Indiana, where harvesting is now going on, no shortage of Twine is reported.

Cordage.—The demand for Rope continues in good volume, especially for the better grades. Some classes of trade appear to be tired of mixed or adulterated Cordage, which was the result of the high price of raw material, and are seeking for the best the market affords. Quotations, on the basis of 7-16 inch and larger, are as follows: Sisal, according to quality, 9 to 10 cents; Manila, on the same basis, 12 cents per pound. A rebate of ¼ cent per pound is allowed on large lots.

Glass.—There are no new developments in the market. Demand continues light, and so long as labor troubles continue there is little prospect of improvement. The Jobbers' Association's quotations are as follows: In small lots, 90 and 5 per cent. discount for the first three brackets, and 90 and 15 per cent. discount for all sizes above, either single or double strength.

Oils.—*Linseed Oil.*—The recent decline in prices has not stimulated demand, which is light owing largely to the small amount which is being consumed. In the present weak condition of the market, with lower prices anticipated by some in the trade, large buyers are not in the market. In June of 1902 manufacturers' quotations were 67 to 68 cents for Raw Oil, according to quantity. Since that time the trend of the market has been downward. One advantage of low priced Oil is the lack of incentive to adulterate it. Quotations are as follows: City Raw, 43 cents in lots of less than five barrels; 42 cents per gallon in lots of five barrels or more. Out of town brands are selling at from 38 to 41 cents, according to quantity.

Spirits Turpentine.—Until the first of the month demand at this point was light and the market without interesting features. Lower prices then stimulated business and large buyers placed some orders. This had the effect of stiffening the market somewhat, but did not advance prices. Quotations, according to quantity, are as follows: Oil barrels, 49 to 49½ cents; machine made barrels, 49½ to 50 cents per gallon.

COLORADO RETAIL HARDWARE DEALERS' ASSOCIATION.

F. C. MOYS, Boulder, Col., secretary of the Colorado Retail Hardware Dealers' Association, has issued the programme for the coming midsummer meeting at Colorado Springs. The meeting will open on Tuesday afternoon, the 7th, when there will be a short address by the president, the reading of the secretary-treasurer's report and general discussion. Two sessions will be held on Wednesday, July 8. The feature of the morning session will be an address by President Bogardus of the National Retail Hardware Dealers' Association. In the afternoon the closing session will be held, when papers will be presented by L. C. Jakway on "Loose Leaf Forms and Methods of Accounts," and J. M. Killein on "Colorado Hardware Jobbers." Arrangements have been made for a meeting that should prove to be enjoyable as well as profitable, as the social end of the gathering has not been lost sight of. Excursions have been arranged for to different points of interest about Colorado Springs and vicinity, and this side of the programme will doubtless be very entertaining. Visitors are accordingly strongly urged to bring their ladies with them to the convention. A railroad rate of one and a fifth has been secured for the round trip, provided 50 attend, a number which, we are advised, will undoubtedly be exceeded.

EXHIBITING SEEDS.

IN the Hardware store of Hull Brothers Company, Danbury, Conn., Seeds in the salesroom are kept as shown in the accompanying illustration. In the foreground of this picture will be seen the seeds kept in packages which are arranged on steps. On other steps near them are quart preserve jars, in which are kept bulk Seeds of which but a limited quantity are carried. Behind these

Exhibiting Seeds.

is a rack, from the iron crossbars of which are suspended galvanized iron pails taken from the regular stock. These are filled with the larger Seeds and those for which there is much demand. When the Seed season is over the fruit jars and pails can be returned to the regular stock and sold and the rack folded up and stored in a small space.

STANDARD WELDING COMPANY, Cleveland, Ohio, are calling attention to their electrical welded Seamless Tubing, which they refer to as fulfilling every requirement necessary for the highest grade of work. Another important branch of their business is the Automobile Rim department, where they are very busy on large contracts. This Rim is described as true to gauge, free from blemish and having electrically welded joint.

The Church Bell.

LETTERS still continue to come in in regard to the Church Bell incident. Some of them are given below. Our readers will recall the circumstances—how the retail Hardware merchant, getting his quotation on a Church Bell from the jobber, was unable to meet the price of a catalogue house quoted directly to the Building Committee.

RETAILERS MUST WAKE UP.

From a Merchant in Illinois: I have followed the discussion on the Church Bell incident with interest, and I think the retailer was primarily to blame for losing the order. All active retailers keep in touch with the price of the catalogue houses that do business in their vicinity, and had this merchant informed himself as to the catalogue price he would have been able to force the jobber to give him a price to meet the emergency, or gone to the manufacturer with an argument strong enough to get a price that would have entitled him to the order.

Retailers Should be Posted on Catalogue Prices

If the principle is accepted that to the quantity buyer the best price should always be given, much fault cannot be found with the manufacturer and jobber for the present condition. However, if the ground is taken—as most progressive retailers do take—that any customer who demoralizes trade by his methods is not entitled to a favorable price but should be put in such a position that he would be unable to destroy the business of the retailers of the country, who handle probably three-fourths to seven-eighths of the manufacturers' output, it reverses the situation.

For the Manufacturer to Consider

It appears strange that the manufacturer of Hardware cannot see in the future, now that the retailers are organizing rapidly and at all their meetings discussing their position, a gradual or sudden dropping of those lines that are butchered by the questionable methods used by catalogue houses. Your correspondents have covered the ground fully, and to those retailers who are apparently deeply interested there is a course open by which they can assist in the solution of these intricate questions. Will they prove they have the courage of their convictions by joining their State retail association, or take steps to organize one in their State where necessary?

Join or Organize Associations

RETAILERS MUST BE ABLE TO MEET CATALOGUE HOUSE COMPETITION.

From an Ohio Merchant: We have read with a great deal of interest the letters in *The Iron Age* about the Bell.

To the first question, Were the Building Committee to blame for buying the Bell from the catalogue house? we should say yes. We think a church building committee should buy their Bells and other material at home rather than from a catalogue house, if the difference is not over 10 per cent. The church gets no money from the catalogue house. All the money for a church or Church Bell usually comes from people who live within hearing of the Bell. We think the money should be kept at home.

Church Committee Should Have Bought at Home

We think the retailer made a mistake in not selling the Bell. He should not expect to make any money from a church committee. If he could deal without losing money he should consider himself fortunate.

We think the jobber should have been able to protect his customer against the catalogue retail dealer. If he cannot do that he had better go out of business. If we cannot buy goods at as low prices for cash as any other party who retails goods in our town, whether that party be in Chicago or elsewhere, then we must go out of business.

Throwing the Jobber Overboard

We believe that as long as the manufacturer depends upon the jobber to distribute his goods through the retailer he should sell to the jobber at prices that will enable him to protect his trade against all comers. If he cannot do that he had better, in our opinion, throw the jobber overboard and go direct to the retailer.

The quantity bought of a given article seems to regulate the price. That being the case, the retailers must combine or co-operate in some way to purchase a quantity sufficient to enable them to get prices as low as any competitor. This can be done in several ways. A stock company could be organized by, say, 50 to 100 Hardware dealers with sufficient capital to buy a cheap lot and build a warehouse near some good railroad, where no horses or wagons would be needed. The company could buy goods and store them in this warehouse, to be sold to stockholders only at cost, with a small per cent. added to pay expenses, or they could be sold at a small profit, which would enable the company to pay a dividend to stockholders. If a dealer wanted credit give it to him to the amount of his stock.

Buying Direct Through Stock Company or Syndicates.

Another plan would be through a syndicate. We are now buying some goods in that way, but cannot buy all we want. We pay a membership fee and are supposed to get goods at cost, or at least as low as any jobber or catalogue house can buy them.

Jobber a Thorn in Retailer's Side

The jobbers are about as hard a proposition for the retail dealer to run up against as the catalogue house. They send out agents everywhere to solicit shops, factories, contractors and almost any party they can sell to. One came to us and solicited one order for Horse Blankets and Whips, and then went from our place to a livery stable nearby for the same purpose.

AN EXAMPLE OF CURRENT COMPETITION.

From an Iowa Merchant: The episode of the church bell is simply an example of conditions and competition of to-day, and the winning of such business is a matter of sagacity and up to dateness in methods of the times, where to buy and how to buy.

We wish to bring to the Hardware and Stove dealers and other merchants notice of another happening from Cedar County, Iowa, one of the banner counties of this glorious State, where the farmer plants his grain and is assured of an abundant crop; where he raises horses, cattle, hogs, &c.; where the farmers and merchants pay taxes to meet the expenses and support the benevolences of the county. In this county the honorable Board of Supervisors at their last meeting, June 1, 1903, allowed a bill for Steel Range Stove purchased of a catalogue house. Does this house pay any taxes or contribute in any way toward anything in Cedar County? Do they buy our produce or donate a penny to our churches or schools?

What we need is more up to date methods in business—heart to heart talks, personal visits and other means of educating the people (who firmly believe in assisting those who assist them) as to who are interested in their welfare, keep stocks of goods and carry their book accounts to accommodate and save them money. But there are some people who come from Samoa or some such place, and cannot be shown.

WILLIAM A. ELDREDGE & Co., Boston, Mass., who formerly maintained offices at 176 Federal street and a warehouse in South Boston, have consolidated the two departments in commodious premises at 74 Pearl street, where, they state, they will carry a more complete line than heretofore of all grades of Steel Wire, Wire Rope, Shovels, Wire Nails and Bright Drawn Screw Stock.

THE TRAVELING SALESMAN HIS METHODS AND CONTROL

BY SAMUEL MASTERS.

CHAPTER XXIII.—THE EFFECT OF FUTURES AND DIRECT SHIPMENTS.

FIFTEEN years ago there was a slack season in the summer, and for a month or two the sales were so light that it did not pay to keep men on the road, so to save expense the salesmen were permitted to stay at home. At that time regular salaries were paid, and the jobber had his salesmen's wages to pay with no return. Some of the houses had arrangements whereby but half the regular salary was paid during this time of idleness, but this custom was not general.

Always Goods in Season.

The addition of new articles to the Hardware jobber's line, so that in every month some goods are in demand, and the practice of selling seasonable goods for future delivery have done much to equalize matters, and the salesman who travels for a commission has at all times a full line of seasonable goods to offer. In this respect the practice of selling goods for future delivery is a benefit to the jobber, but there are few other redeeming features to this method of selling, which yields more of annoyance and of profitless detail than any other one thing the jobber encounters.

Lines Sold for Future Delivery.

Door and Window Screens, Wire Cloth, Fence Wire and Rails, Refrigerators, Ice Cream Freezers, Steel Goods, Scythes and other spring and summer goods are frequently sold for May and June delivery before the snow of the preceding winter has begun to fall. So anxious are some jobbers to get into the market early that instances are known where they have taken orders for Screens and Wire Cloth at a price based upon the settling price of the previous season before they had concluded arrangements for the new year's supply, judging from the general condition of the market that there would be no advance in these commodities. Salesmen frequently clamor for prices on seasonable goods for future delivery, in order to be the first in the field, and thus aid in further extending the time between sale and delivery.

Salesmen's Copies of Futures.

The salesman who takes orders for future delivery should always have with him copies of such orders, for he will usually have occasion to refer to them time and again before the date of shipment. Customers often change the quantities or assortment, and reductions in prices must be promptly met, for such orders are always taken with prices guaranteed against declines.

No Chance for Advance.

Until the goods are shipped the jobber is at the mercy of any competitor, be he jobber or manufacturer, who chooses to name a lower price, while there is no opportunity to secure a higher figure should the market stiffen. He must, therefore, have a contract with the manufacturer which contains a guarantee against declines, and the manufacturer in turn limits the quantity sold on such a contract to a specified amount. When this is exhausted a new contract must be made, and it is here that the jobber who was first in the field and first to sell out his contract is at a disadvantage in the latter part of the season, if the demand has been large and the market is stiff or advancing.

Detail Increase as Prices Change.

If the market is declining or the jobber has contracted for so many goods that he fears he will not be able to dispose of them all he is likely to reduce his price or offer more liberal terms to induce customers to buy; and since every change in price or terms affects every unfilled order on his books the clerical work is correspondingly increased and the salesman's troubles are multiplied in proportion. His customers treasure lower quotations or rumors of declines as a basis for a reduction in prices on purchases made and from the date that such an order is taken until it is filled and the bill paid the order is a constant source of care.

The wise salesman keeps a copy of every order that is taken, whether for immediate or future shipment. Many jobbing houses furnish salesmen with pads or order blanks interleaved with thin sheets for carbon copies; others furnish pocket order books in which the salesmen write the orders as given by the dealers and afterward transcribe them onto the order sheets for transmission to the house. This latter method gives the salesman a more compact record and one which is thus easier to carry and refer to, but it has the disadvantage of requiring that the entire order be copied.

Direct Shipments.

With the introduction of future shipments there came a change in the method of filling orders, and direct shipments from factory to retailer became a part of trade policy, the freight allowance which would be made to the jobber on shipments to his stock being given to the customer instead. The jobber is saved the trouble and expense of handling the goods; the customer has a freight allowance which reduces his cost; the salesman has one more detail added to his already heavy burden and an added difficulty in writing his orders.

Loose Leaf System of Orders.

Were all goods to be shipped from stock immediately on receipt of requisitions the salesman could enter his orders for different kinds of Hardware on the same sheets, the only exception being the classification into departments where such a division is required. Now, however, an order is divided and subdivided in an intricate fashion which requires much extra writing. Stock goods of miscellaneous character must be grouped on one set of sheets; Cutlery on a tinted sheet, that it may at once go to the proper department and that the sales may be figured separately; House Furnishing Goods, Saddlery, Sporting Goods—any or all on sheets of different colors, for the same reason; direct shipments, whether immediate or future, upon other sheets, each shipment on a separate sheet, with each item fully listed and priced, with name and address of customer, date of order, terms of payment and delivery and shipping route filled in. These orders are never copied in the house. The original sheets are used in getting out the goods or entering the orders with the factories for direct shipment; shipments are checked in the margin, invoices are made from them, costs are figured from them, and they finally find a permanent place bound in the orders of the salesman in the office files. It is thus of prime importance that the orders be properly and carefully written with proper attention to trifling details.

THE importance and value of the up to date and convenient arrangement of Hardware stores is well brought out in a recent canvass of their customers made by J. D. Warren Mfg. Company, Chicago, who some ten years since began the manufacture of Hardware Shelving and later that of a constantly increasing line of Cabinets, Cases, Fixtures, &c., for use in Hardware stores. With a view to ascertaining the opinion of purchasers of their Shelving as to its merits, the company recently sent out a multitude of postals requesting the buyers to reply to certain inquiries. A recapitulation of the answers, we are advised, shows that following the installation of Warren Shelving the houses who were canvassed had the following experience:

Percentage of increased sales	25 per cent.
Percentage less capital required	25 per cent.
Percentage of goods saved from injury	33 per cent.
Percentage of goods saved from being misplaced and lost track of	30 per cent.
Percentage of time saved in serving customers	35 per cent.
Number of months in which its advantages will pay for the shelving	11 months.
Percentage of customers preferring it to the old style shelving	99 per cent.

This will be recognized as a very gratifying exhibit, while it is also full of suggestion to merchants whose methods and stores are behind the times, as emphasizing the importance of convenient and attractive arrangement.

HARDWARE STORE WINDOW DISPLAY.

BY A. W. WALTER.

MANY Hardware dealers believe that it is almost impossible to make a good show window display without years of training and experience. There is just where they make their biggest mistake. They never try. What will attract the attention of the people to your store any quicker than well trimmed windows? What will cause them to step in and buy any quicker than attractive prices attached to attractive goods? What will hold your trade any better after you get it than neat show windows often changed? It has been the experience of a great many merchants that from the time they began to make use of their show windows was the time that their business began to move forward and to steadily increase.

LEARN FROM THE DEPARTMENT STORE.

Who ever heard of a large city department store allowing their goods to be piled in the window in a dirty and shapeless mass? If window trimming has proved a success with that class of merchants, why cannot Hardware dealers apply the same plan? I will admit that we cannot all have plate glass fronts, but what we have can at least be kept clean.

MARKING PRICES.

As to the matter of attaching prices to articles displayed, I would say that that constitutes half the display. These price cards are silent salesmen and will save you the trouble of answering many annoying questions. If you are not handy with a marking brush, buy a set of rubber stamps and some very neat cards can thus be made.

PAYING DISPLAYS.

Cutlery, Lamps, Tools, Paints, Brushes and other goods of similar nature yield the best results for a window display, but this may vary in different communities. In the spring Gasoline and Oil Stoves would make a desirable display. A little later in the season Refrigerators, Freezers and similar goods could be advantageously shown. These may be varied by displaying household goods, &c. In the fall a display of Axes, Saws and Wood Choppers' Supplies would call a customer's attention to the fact that he is in need of some of these goods. Cutlery, Tools and Lamps make a desirable display at all seasons.

WINDOW HELPED BY THE NEWSPAPER.

Show window display and advertising are closely related, and a good, spicy ad. calling attention to a certain window display will always attract a good deal of attention to the dealer. I have one instance in mind where a Hardware house called attention to their display of Food Choppers through their local papers when their whole window was taken up by these goods, and the result was that the store in question constantly had a large crowd outside their windows as well as inside the store.

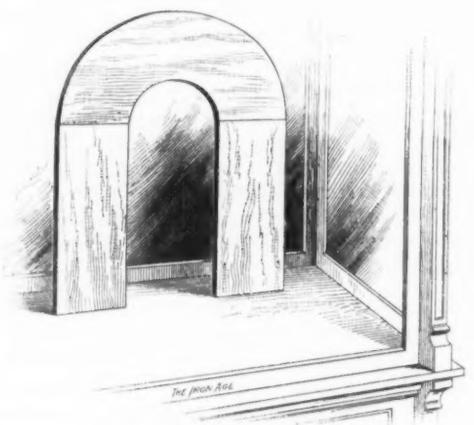
HAVE SOMETHING STRIKING.

The main feature of any display should be to have something striking, something that will attract the people and make them stop to see what it is. After you have accomplished this it will be their next intention to see what lies behind those windows, and if your store is kept neat and orderly you may rest assured that they will call again.

BACKGROUNDS, RACKS, SHELVES, ETC.

Where the most difficulty is experienced is in the matter of backgrounds. They should be so constructed as not to obstruct the light from the interior of the store, and also in such a manner that any article may be easily removed. There is generally plenty of old lumber lying around taken from boxes and crates, from which backgrounds and a good many different forms of racks, shelves and stands can be made without going to any expense for material.

The background shown in the accompanying illustration is very neat and may be covered with white or purple cheesecloth. The two uprights consist of plain boards. The arch part is made separate from these and is held in place by cleats screwed on the back. The main feature of this background is that it will not obstruct the light from the interior and also that any article may be easily removed from the window. A small platform or series of steps can be placed between the arch if desired. This background may be varied in size to fit any particular window.



A Window Background.

A FEW HINTS.

Price everything you show. Then the observer will know whether he can afford to buy it or not, and will be saved the disappointment of asking the price of an article beyond his means.

Black affords the best relief for polished Tools or Cutlery and white for dull finished wares. Tinted cloth may be used to back Tinware or Granite.

Saws, Tools, Cutlery &c., may be displayed without danger of rusting if treated as follows: Melt paraffine wax in a tin dish and while in liquid form dip a soft cloth in it and rub lightly over the surface of the Tools. This gives a very thin coating, imperceptible to the eye, but which absolutely prevents rusting. Care should be taken not to touch the surface after being treated as above.

Common mica may be easily colored red by a coating of pikron. In displaying Stoves red mica, with a light inside, will make a glowing attraction. Red tissue paper may also be used.

There is so much in a Hardware store that is dark that a few plants of some kind will give a cheery appearance to your displays.

A FEW DON'TS.

Don't leave displays in the window too long.

Don't let the goods in the window become covered with dust, but keep them clean.

Don't let the glass become dusty. Keep it bright and clear.

Don't imagine you are the whole thing because you have made a few good displays. There are others.

And, lastly, don't praise your own trims. Let the public do that.

THE HARDWARE WINDOW.

BY R. C. WENCK.

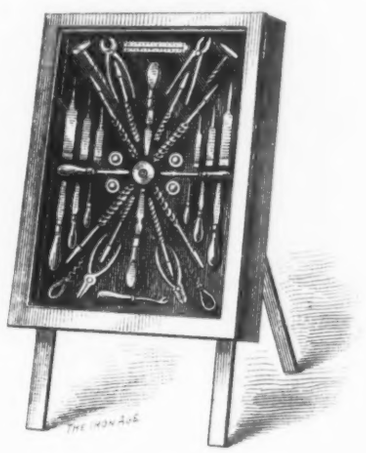
THAT window advertising is one of the most successful and effective means of drawing trade no one who has tried it will attempt to deny. The question that arises in connecton with this subject is, how it can be carried on to accomplish the most and secure the best results. Various plans have been tried in our establishment, but the one that brought the best returns for time and money expended, was the frequent change and constant display of seasonable goods.

When I first entered our establishment there was no plan of window display followed. The goods on exhibition were changed at long and irregular intervals, and for a time I allowed the matter to rest as it was, but I soon noticed that when the windows had been cleaned and other goods arranged in them they attracted the

attention of the public. We finally decided on the plan we now follow—*i.e.*, frequent change of seasonable goods. There are so many different articles kept for sale in modern Hardware stores that changes can be made at least every two weeks, and more frequently if desired. I sometimes find it desirable to change every week. This is the case in the spring and fall.

DISPLAYS AT DIFFERENT SEASONS.

Immediately after our annual inventory, which is taken the first week in January, we fill the windows with shopworn goods and other articles we desire especially to get rid of. These goods we display for about two weeks, or until they are all sold, marking the prices on them plainly, as we do with all the smaller goods exhibited from time to time. Following our display of these goods we show Lamps, Nickelplated Ware, Carpenter Tools, &c., until the spring trade opens. With the opening of this trade change of display should be made more frequently. Garden Tools and Seeds, Carpet Beaters, Stretchers and Sweepers, Poultry Netting, House Cleaning Goods, Horse



A Tool Display Case.

Brushes and Curry Combs, Fishing Tackle and Bicycle Sundries should all be well exhibited. During the summer Screens, Lawn Hose and Sprinklers, Lawn Mowers, Oil and Gasoline Stoves, Refrigerators and Baby Carriages can all be shown to advantage. Oil and Gasoline Stoves should be kept filled, ready for exhibition and explanation, while Refrigerators should be shown inside as well as out.

In the fall house cleaning goods should again be brought out. Mouse and Rat Traps, Lamps and Lanterns, Guns and Ammunition, Butchering Supplies, followed later by Cutlery and Christmas goods, are all seasonable goods.

NOVEL DISPLAYS.

I have tried on different occasions novel displays. During the recent winter we had a Bicycle which was constructed of Grindstones, Axe Handles and other articles. This attracted much attention and gave us considerable advertisement. But it brought few customers. It is a good plan to arrange some display of that kind during the winter or late summer, but at other seasons the space is too valuable to waste in furnishing amusement for the small boys.

ARRANGING THE DISPLAY.

I have found it a good plan to exhibit only one or two articles at a time, but make the display of them extensive. A window filled with a large number of one or two attractive styles of Lamps will bring more customers than if only a few of 10 or 12 styles are shown. With all the display, unless the goods are arranged attractively, the best results will not be obtained. The windows should be well lighted, but not so much so as to dazzle the eyes of the passerby.

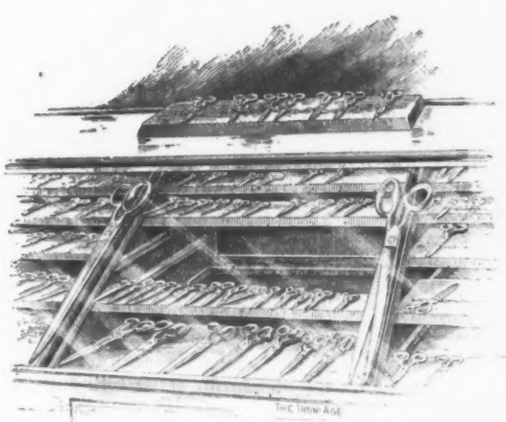
BACKGROUNDS AND FIXTURES.

The background should be of such a color as to show the goods to the best advantage. Cheese cloth is perhaps the most inexpensive article that can be used for this, as by having several shades on hand, made to fit the window, the change can be quickly made. All goods do not show up well on the same appliances. By saving the good boards from boxes various display stands can be constructed at a trifling expense, and when not needed for the windows can be used in the store or put away for future use. One of the most convenient display cases we have is shown in the accompanying illustration. It was made from a 28 x 32 glass box. One side was taken off and a common window sash fitted on for a door; legs were put on to make it stand, and Bits, Chisels and many other articles can be shown in it to a great advantage.

Frequent change means much work, but if a merchant wishes to succeed he must be prepared to devote all his time and attention to the means that give the best results and most profit. Nothing so injures the reputation of a merchant as to have his windows full of dust and unseasonable goods. Constant effort wins its reward and thorough advertising brings customers. Constant effort in window dressing is thorough advertising, and is a sure winner if rightly followed. Each merchant should remember that what is good in one locality may not be good in another, and should try to learn what suits his trade and then work on that line.

SCISSORS IN THE SHOWCASE.

IN the store of the Danbury Hardware Company, Danbury, Conn., is an elaborate display of Scissors. In the showcase, the front of which recedes, are placed four rows of shelves, as shown in the accompanying illustration. Scissors are placed on the bottom of the showcase



Scissors in the Showcase.

and also fastened to the four rows of shelves above it, as shown. When a customer desires to examine the Scissors on any particular shelf, the clerk opens the back of the showcase and pulls out of the proper shelf, placing it on top of the case, as illustrated. In this way an exceptionally fine display can be made, the goods protected and the required amount of space minimized.

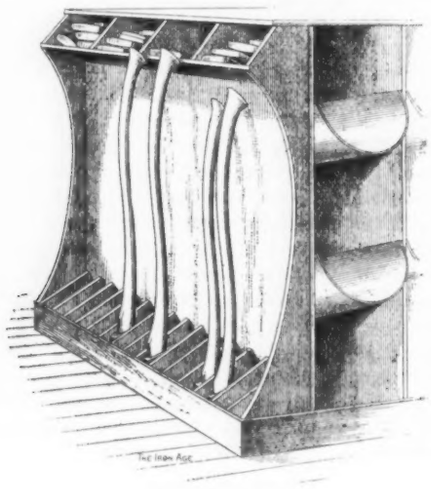
DEATH OF GENERAL WITHINGTON.

AS we go to press we are advised of the death by heart failure of Gen. W. H. Withington, June 27, at his home in Jackson, Mich. He was president of the Withington & Cooley Mfg. Company, Jackson, Mich.; National Snath Company, Erie, Pa., and the American Fork & Hoe Company, Cleveland, Ohio. He was widely known and prominent in public affairs of both his city and State. A more extended notice will be given in another issue.

ANNOUNCEMENT is made that on and after July 1 the business formerly carried on by the Waterbury Rope Company, 69 South street, New York, will be conducted under the name of Waterbury & Co. The management of the concern will continue unchanged.

KEEPING AXES.

AT the end of the Nail counter in the store of the Danbury Hardware Company, Danbury, Conn., is a rack for holding Axes, which is illustrated herewith. It will be noticed that in the bottom of this rack are placed small partitions, into each of which one Axe is set. In



Keeping Axes.

the upper part are four compartments in which Axe Heads are accommodated. This rack takes up little room and while in it the edges of the Axes are protected.

TRADE ITEMS.

HERMAN EDWARD LAUTNER, junior member of the firm of Lautner Hardware Company, Allegheny, Pa., died at his home in that city June 21. Mr. Lautner was born December 7, 1867, in Allegheny, and after taking the course of education prescribed in the common schools, attended Professor Oetting's Academy, from which he graduated, after which he received a business education at Duff's College of Pittsburg, Pa. In 1882 he was employed by the firm of Jos. Lautner & Co., where he continued until January 1, 1894, when he was admitted to a partnership under the firm name of Lautner Hardware Company. While Mr. Lautner was recognized as a thorough all round Hardwareman, he was especially proficient in the line of Builders' Hardware, and the firm of which he was a member received the contracts for furnishing the Hardware for a number of the finest buildings in Pittsburg and Allegheny. He is survived by a widow and one child.

BRANDENBURG BROS. & ALLIGER, 103 Reade street, New York, and 85 Lake street, Chicago, have just been appointed the selling agents of the Turner Brass Works, Chicago, Ill., for their Automobile Specialties, including their Patented Carburetor, illustrated in our columns June 18; Spark Plugs, Double Acting Pumps, Foot Treaders, Blow Torches, &c. They are also authorized to solicit orders for Aluminum Castings for any and all purposes, of which the Turner Works are large producers. Brandenburg Bros. & Alliger are selling agents for both Automobile and Bicycle material, marketing the entire product of the Aurora Automatic Machinery Company, Aurora, Ill., manufacturers of the Thor Fittings.

BENJAMIN S. ALDER, 37 Warren street, New York, has been appointed the direct representative of Bemis & Call Hardware & Tool Company, Springfield, Mass., for the sale of their goods to New York City and export trade. This is somewhat of an innovation for the Bemis & Call Company, as they have not been directly represented in this city before. Mr. Alder will also represent the Empire Chain Company, Pittsburgh, Pa., manufacturers of Coil, B. B., Dredge, Cable, Switch, Brake and kindred chains.

H. W. Moore will continue under his own name the business formerly carried on under the style of Wait & Moore, Antwerp, N. Y.

CONTENTS.

BRITISH LETTER.

Offices of *The Iron Age*, HASTINGS HOUSE, NORFOLK ST., LONDON, W. C., June 20, 1903.

The Week's Hardware Trade.

DURING the week we have had a record rainfall, and as yet summer is unnecesarily coy in coming. This has had a depressing effect upon activities at the seaside, with a corresponding shrinkage of orders from travelers from seaside customers. The home trade still continues somewhat slack, with purple patches here and there. For example, Metallic Bedstead makers are unusually busy just now. Edge Tool and Horticultural Implement makers are also doing well, and there is a good demand for Builders' and Naval Ironmongery. The reduction of the bank rate of 3 per cent. this week has produced a good feeling in commercial circles, but it is as yet too early to speculate upon its exact commercial bearing.

In the export department business is well maintained with Canada, South Africa, the United States and most of the South American markets. Continental business, however, is still unusually dull for this time of the year, and the recovery of British trade with China is of slow growth. East Indian orders continue up to the average, more especially for Railway and Irrigating Material, Water Works Plant, Edge Tools, Galvanized Sheets, Wire, Mining Tools and Yellow Metal. The Australian colonies are evidently still suffering from the effects of the late drought, and apart from orders from Western Australia, the business recently done with the commonwealth is distinctly below the average. British trade with Cuba, once so valuable, is now adversely affected by the inroads of American competition under the preferential tariff, but with some of the other West Indian Islands we are doing a good and growing trade. Orders from Denmark, Norway and Sweden are below the mark, but slightly better orders are coming from Germany, Belgium and France, more particularly in Sewing Machinery and Domestic Fittings, Sanitary and Lavatory Appliances, especially such appliances as are adapted to the requirements of British and American tourists. British Sporting Guns of the better class are still selling well in France, but in Ammunition British makers do not hold their own against the cheap makers of Belgium and Germany.

From Sheffield comes the report that Cutlery houses are doing better business with South African, Canadian and Indian markets than for some time past. Canadian orders for Sheffield goods are at the present moment better than for some years past. Some slight improvement in the Australian trade is reported, but development comes very slowly. Manufacturers of High Class Cutlery are hampered by the increasing cost of pearl, which in the last month has gone up very much.

Difficulties of Establishing Contact.

In conversation the other day with an American acquaintance in the city he told me of a letter he had received from a friend in New York, who was anxious to establish trade connections in this country. His aim was to sell in New York a number of British Hardware Specialties which would fit in with his present trade. My friend told me of the difficulties that met him in his search, and I asked him if he would be good enough to put into writing exactly his experience for the benefit of readers of *The Iron Age*. He has accordingly sent me the following memorandum:

A friend of mine in New York who is established as an agent for the sale in America of an important British metal specialty found that he could easily take on two or three other articles of British manufacture, and wrote to me to make some inquiries in London for him. I at once bethought me of the *Board of Trade Journal*, which, if one may judge from the standing notice which it repeats week after week, exists for the purpose of finding such outlets for British manufactures. Accordingly I addressed a request to that publication and inclosed a form of announcement, to be inserted under the caption of "Openings for British Trade." I received their reply that these announcements could not be accepted unless they were transmitted through the United States Consul-General in London. It struck me that the briefest possible inquiry would have established the *bona-fides* of my correspondent, and that this was an unnecessarily troublesome demand to make of me. Nevertheless, I wrote to the United States Consul-General in London and asked him to transmit the announcement to the Commercial Department of the Intelligence Branch of the Board of Trade, &c. He replied: "The request you make is not consistent with the duties of the consular service. The insertion of such an advertisement would put the Consulate in the position of acting as agent or go-between." This brought me to something of an *impasse*, for on the one hand the people in charge of the *Journal* would not look at me unless I were ushered in by the United States Consul-General, and the latter official, equally fettered, could not facilitate my business, simply, I should judge, because it was business. I thereupon wrote again to the Commercial Department of the Intelligence Branch of the Board of Trade, &c., &c., mildly pointing out that I was still as far from my goal as ever, asking for suggestions, and the official, courteous as ever, "Regretted the matter was not one he could officially advise me upon;" but he inclosed a copy of some official circular and called my attention to paragraph 3, upon reading which I discovered that "Foreign firms abroad who desire to take advantage of the *Board of Trade Journal* for the purpose of communicating with British manufacturers should apply to His majesty's Consul."

By this time something like a month or two had elapsed. I thereupon wrote my friends in New York and advised them to apply to the British Consul in New York City. They called upon the gentleman and were requested to put their demand to him in writing. I suppose this was to prevent the possibility of any speed being made. Two months then rolled away and were gathered into the shades of the past. At the end of that time my friends heard from the British Consul-General to this effect, after the usual preamble: "I am unable to assume the responsibility connected with recommending the insertion in that journal of an advertisement in the terms proposed."

The Gordian Knot Cut.

As a pendant to the above narrative, my correspondent adds that he inserted for his friends in the *British Trade Journal* an ordinary advertisement stating what was desired, and that at the present time they are negotiating with several manufacturers in this country. This latter transaction, it may be added, required the expenditure of only a few shillings and one letter.

Trade Along Lines of Least Resistance.

Although, in this instance, an American tried to utilize a British public department to establish trade relations in the interests of British manufacturers, yet it may be observed that he received no support from the American consular office, so that it is to be presumed that if an American manufacturer in New York were to attempt to establish trade relations with a view of increasing his business on this side of the water he would be met by the same attitude of *non possumus* from the American Consulate in London. I am well aware that most business men prefer to push their business by their own machinery; but inasmuch as these public offices are established mainly for the purpose of aiding business men and expediting business, it would seem as if there is a screw loose somewhere.

Prices of Cut Nails.

The quarterly meeting of the Association of Cut Nail Manufacturers was held last Wednesday in London. The attendance of members was large and more representative than on some previous occasions. It was decided to make no alteration in selling prices at present.

Fixed Prices for Wire Netting.

The question of fixed prices in one or another department of the Hardware trade is gradually forced to the front. Recently, at a meeting of the Lancashire County Ironmongers' Federation, the central board of the federation was asked to take action in the matter of a national retail price for Wire Netting. The discounts for Wire Netting vary so enormously, and the trade is so irregular, that Wire Netting is not a remunerative article, although it ought to be. It was therefore felt that if a uniform selling price could be established for Wire Netting, the ironmonger would secure a fair profit. There is reason in this belief, because Liverpool and Southport have both, through the association, secured a uniform selling price, and have been entirely successful. In Manchester, however, and other towns, much competition is felt from ironmongers not connected with the association, so that it was found impossible to sell at the prices fixed in the Liverpool list. The manufacturers are, of course, by no

means anxious to see their products sold at cut prices, because it has a flattening influence upon the trade, but are not disposed apparently to make any special effort to establish a fixed price. Barnard, Bishop & Barnards, one of the most prominent makers of Wire Netting, say that they continually hear of agents in various parts of the country who sell Wire Netting at retail at a profit of from 2½ to 5 per cent., while other retailers expect 30 to 40 per cent. Lawes, Ash & Co. of Birmingham think that the question concerns the retail trade only, but do not think that Wire Netting manufacturers can enforce price maintenance conditions. F. Braby & Co. of Euston road, London, N. W., a well-known house, state that they would be glad if retail ironmongers could arrange a list among themselves, but they have ceased to feel any interest in the Wire Netting trade, owing to the severity of competition prevailing. This competition, they add, does not only come from British firms, but to a great extent also from the Continent.

Fixed Prices for Sporting Cartridges.

The well-known firm of Kynoch, Limited, of the Lion Works, Witton, Birmingham, have decided to introduce a price maintenance arrangement in their Sporting Cartridge trade. This action has been taken owing to the introduction of the cheap Cartridge. Cheap Cartridges have been recently so much the order of the day that sportsmen have become irritated and will now pay a fancy price for Cartridges which can be depended upon.

British and American Hardware Goods in Australia.

A letter from Robert C. Holcroft of Wellington, New Zealand, draws the attention of Birmingham manufacturers to the state of trade in Australasia. Of course New Zealand is not necessarily Australia, but trade conditions are not vastly different. For that matter there is a greater disposition in New Zealand to buy from England than there is in the continent of Australia. What, therefore, follows may be taken as the very maximum of commercial good will in Australasia toward Great Britain. In view of the proposal to link up the colonies in closer commercial bonds, this letter comes as a timely reminder that what Australian buyers, like everybody else, want is a suitable article, and they will not allow adverse tariffs to stand in their way. The letter is as follows:

As a native of Birmingham who, though at the other end of the world, still takes a great interest in the good old town, may I try to rouse its manufacturers to a sense of the immense amount of business they have allowed to pass their doors through being too conservative, not only in their ideas, but often in the patterns of the goods they turn out. They do not seem to realize how much the colonies would prefer to deal with their own kith and kin, so to speak, if makers would only give them the article they want. I inclose you a list of some of the lines we are importing from America and Germany that with a little enterprise English makers could supply us with.

HOLDING TO OBSOLETE PATTERNS.

Unfortunately, with a few exceptions, which I will name presently, makers persist in keeping to the old styles and shapes their grandfathers turned out. They practically say, "If this does not suit you, we are too busy or it would be too expensive to make any other shape." Thus the colonies have had to go elsewhere, as my list shows. How different is this to the American or German makers! They will make any article to the shape and size required in order to get the trade. I venture to assert that neither Germany nor America would be in the position each is today with regard to its export trade if British makers had risen to the occasion.

SLIGHT PROGRESS IN SHOVELS.

About 25 years ago a pattern of the American long handled Shovel, used here and in Australia, was sent home to see if makers could supply it, but the reply was so unsatisfactory that we had to go to America. The loss to British trade in this one article alone must be many thousands of pounds annually. I think it would be very interesting reading and a regular eye opener if your Chamber of Commerce would get statistics from here and the Australasian colonies as to the volume of trade done with America and Germany in lines that could be supplied from England. I said there are two exceptions where makers are showing a desire to supply us with what we want. Among others, a Birmingham firm is now sending us a long handled Shovel, and although it is not an "Ames" pattern it is taking the market well. Other makers have also sent us the same article, but although the quality is right the pitch of the Shovel is all wrong. Then another of your firms is now making Hand and Cross Cut Saws on the American pattern, and the increase of trade must be very satisfactory. Now why could not this have been done years ago? Before the patriotic feeling roused by the late war has cooled down let me urge manufacturers to make another effort to increase their trade, not only with the colonies, but all foreign parts, especially Africa and Siberia.

ABOUT COLLECTING SAMPLE ARTICLES.

To some it may be too expensive to send out a man to collect samples of the articles used in various countries, and otherwise get all the information possible as to their requirements; but I would suggest to makers to form an association for furthering and extending their trade to all parts of the world. Let them quit their petty jealousies one toward another. The duty of the association should be to send level headed, sharp business men to visit all parts of the world, bringing back samples of all the articles used, best route for shipment, &c.

THE DIRECTORY AS A MAILING LIST.

When the articles are exhibited to the makers each one could take up the manufacture that his machinery and premises are best fitted for, and if several took up the making of one article they would all get a fair share of the trade, or it would mean the survival of the fittest. My plan may not be feasible, but it would certainly be economical, for the expense of the experts employed would be a mere bagatelle when shared among the members, and they would be in possession of information it would be impossible for them otherwise to obtain. Let me give makers a word of advice. It is not a bit of good taking foreign directories and sending their catalogues broadcast. Some of the firms are nonexistent and the others—well, nine times out of ten they go into the waste paper basket and are never read. I am speaking because I know, and if the same amount of money is spent in the direction I have indicated I am sure the result would be far more satisfactory.

COMPLIMENTARY ALLUSIONS TO AMERICAN METHODS.

P. S.—I forgot to draw attention to the nice way the Americans "box" all their goods, and where screws are required they are always included, so that if the article has to go up the country the parcel contains every requisite for fixing. Canada and Japan are both sending us beautiful wall papers.

Importations Into Australasia.

Hardware Lines Imported from Germany: All kinds of Steel Toys, Scissors, Enamel Ware, Brush Ware of every description, Fencing Wire, Fencing Staples, Wire Nails, Razors.

Hardware Lines Imported from America: Buggy Axles and Springs, Gas Pipes, Axes, Carpenters' Braces, Hand and Breast Drills, Twist Drills, Bolts and Nuts, Picks, Mattocks, Draw Knives, Iron Planes, Hammers, and all kinds of Carpenters' Tools, all kinds of Farriers' Tools, Files of all kinds, Hatchets, Hoes, Garden and Harvesting Forks, Garden Rakes, Fencing Wire, Wire Nails and Fencing Staples, and many lines of Wire Goods such as Bird Cages, Gridirons, Egg Whisks, Wire Hat and Coat Hooks, every kind of Door Cupboard and Pad Locks, Horse Nails, Stocks and Dies, all kinds of Table and Hanging Lamps, Cooking and Heating Stoves, Wrenches and Spanners, all kinds of Saws, Long Handle Shovels and Spades, Grindstone Fittings, Clothes Wringers, Cast Iron Pumps, Ammunition, Sash Cord, Carpet Sweepers, Lawn Mowers, Counter Scales and Weighing Machines, Agricultural Implements, Enameled Baths, Copper Bull Rings, Steel Butts, T-Hinges.

Lines for Which the English Makers Still Keep the Trade: Steel Wire Rope, Mail and Dray Axles, Digging Spades and Forks, Brass Foundry, Fenders and Fire Irons, Meat Choppers, Garden Shears, Sheep Shears, Scythes, Slashers, Trowels, Carpenters' and Wheelers' Adzes, Wood Planes, Fire Proof Safes, Bedsteads, Sporting Guns, Galvanized Wire Netting, Cutlery, most of the lines in Electroplated Ware, Tinned Hollow Ware, Galvanized Buckets and Tubs, Glass, Paper and Emery Cloth, Iron and Brass Wood Screws, Bar Iron, Plain and Galvanized Iron, Register Grates, India Rubber Belting and Hose, Leather Belting.

Lines About Equally Divided Between English and American Makers: Bolts and Nuts, Tire Bolts, Stocks and Dies, Gas Pipes, Scales and Weighing Machines, Locks of all kinds, Fencing Wire, and some lines of Elec-

troplated Ware, Varnishes, Hand and Cross Cut and Circular Saws.

Keeping Ahead of the Hounds.

The exhortation and hints given to British manufacturers in the foregoing can, of course, be utilized by progressive American manufacturers, if so disposed.

Motor Cars for South Africa.

Arrangements are being made by the authorities for the purchase of 100 or more motor cars for shipment to the Transvaal and the Orange River Colony. These are to be employed for mail purposes, pending the completion of the various new lines of railroad now under construction or in contemplation, and they are to be attached to stations on the main line, whence they will take the mails and other postal matter daily over districts which are now being mapped out.

THE HARDWARE MERCHANT'S TRADE WINNING METHODS.

This department contains information in regard to approved methods of attracting customers by means of advertising, circulars and special expedients and methods which have been found useful by enterprising and progressive Hardwaremen.

A cordial invitation is extended to merchants to co-operate in the effort thus to inform the trade in regard to up to date methods.

STREET CAR ADVERTISING.

THE JOHN E. BASSETT & CO., Hardware dealers, New Haven, Conn., make use of the cards in the street cars in advertising their business. While they are unable to trace direct results to these, they feel confident

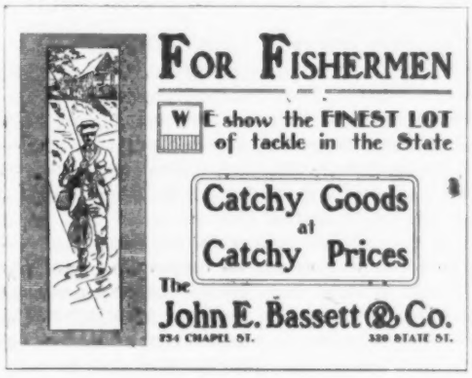


Fig. 1.

that this class of advertising pays. The size of the advertising signs which they use is 11 x 14 inches. Fig. 1 is a reproduction of a white card used to advertise fishermen's supplies. The type matter and cut are printed in a dark bronze blue, and the borders, underlining and background for the illustration are of delicate light blue.

Fig. 2.

The illustration used was a direct enlargement of a small cut which appeared in a magazine, and was made by a local photo-engraving house.

A white card advertising Dog Collars is shown in Fig. 2. This is printed in two colors—black and burnt sienna. All of the printing is in black with the exception of the double rule under the heading, the words "Prices to Fit You," with the ornament under it and the address line, which are in burnt sienna. Fig. 3 shows a manila card, across which are two 1-inch strips of orange; over these are printed the attractive advertisement of Cutlery in black.

Fig. 3.

PUBLIC BULLETIN BOARDS.

ABOUT five years ago the Wooster Hardware Company of Wooster, Ohio, inaugurated the scheme of providing farmers with bulletin boards, as shown in the accompanying cut. A board of this kind is given, free of charge, to any farmer who calls at the company's store for one and agrees to put it up at the gate or driveway

Public Bulletin Boards.

to his premises. The company advise us that there has been a large and continuous demand for these boards, and that they are found set up as far away as 20 miles from the company's store.

How the Boards Are Made.

The boards are 20 inches high and 24 inches long. The white space at the top, in which the farmer's name is printed, is about 2 inches wide. The space next below is about 10 inches wide and is painted several coats of blackboard slating. A yellow perpendicular line divides it into two equal spaces and the upper and lower edges

are also marked with yellow lines. At the top of one of the black spaces is "Wanted," while the other is headed "For Sale," both printed in yellow. The lower portion of the board is 8 inches wide, painted white. A stencil is used for putting the company's name and business on, in black.

An Advantageous Investment.

These boards have been found to be one of the best means of keeping the company's name before the public, as the farmer finds them useful for advertising anything he may have for sale or that he wants to buy. If he wants to buy a horse he simply writes the word "Horse" under "Wanted." If he has a horse for sale the same entry is made under "For Sale." On some of the public highways about Wooster, the company explain, hundreds of people would see the board and the farmer's advertisement in one day, and in this way the boards serve a double purpose in the way of advertising, aiding the farmer as well as the company.

Annual "Opening."

Most of our readers will no doubt recall the account of the annual "opening" of this company, which appeared in *The Iron Age* of January 8, 1903. Another affair of this general character was given on April 9, 10 and 11 of this year with equally gratifying results.

THE RETAILER'S ADVERTISING.

THE place of advertising in business is touched upon in the following verses from the pen of a workman in the employ of the Columbian Hardware Company, Cleveland, Ohio, who writes under the *nom de plume* "Old Timer:"

BE HONEST AND ADVERTISE.

I often think that the printer's ink
Announces a certain loss,
And the "ads" I read will not succeed,
Of many I come across.
But a thinking man can quickly scan
The hidden deceit and lies,
But it pays in the end, my gentle friend—
Be honest and advertise.

In every trade where wealth is made
The good and the bad engage,
And lay their snares or sing their wares
From an inch to an entire page.
But the guilt will shine in every line,
No matter how men disguise,
So always act on the simple fact—
Be honest and advertise.

The common plan of the honest man
Who states what he has to sell
In simple vein and language plain
May take some time to tell.
But the truth will out with a mighty shout,
And the sound will pierce the skies,
So you can't go wrong to follow my song—
Be honest and advertise.

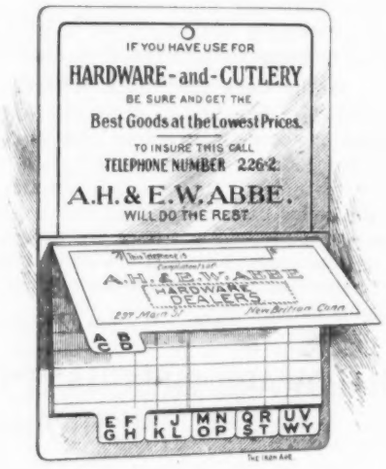
But there's many a wile in the art and style
That covers an ugly fraud,
And it may succeed and its victims bleed,
At home as well as abroad.
But the thin veneer will disappear,
And the fraud look twice its size,
Then the crooked game will end in shame—
Be honest and advertise.

This life's too brief to create belief
In everything we say,
So the artful chap just baits his trap
In his most enticing way.
And as fish will bite, by day or night,
Whenever they see the flies,
So men will d—n when they bite the sham—
Be honest and advertise.

Be honest and true in all you do,
And keep your courses clear,
Keep pushing ahead with a steady tread,
And never a doubt or fear.
"There's many a slip 'twixt the cup and the lip"
Of the rogue before he dies,
But never a miss if you stick to this—
Be honest and advertise.

A TELEPHONE DIRECTORY ADVERTISEMENT.

A. H. & E. W. ABBE, New Britain, Conn., have recently gotten out and distributed to their patrons an attractive advertisement in the form of a telephone directory, which is shown in the accompanying illustration. This directory consists of a card 5½ x 8½ inches, on which is printed an attractive advertisement. Below this is fastened a six-leaf index, ruled to receive names and telephone numbers. An advertisement of this character, while costing somewhat more than many forms in use, and therefore not suitable for indiscriminate distribution, is of value to the receiver, and is apt to be kept for a long time in a conspicuous place. These directories,



A Telephone Directory Advertisement.

which are copyrighted, are published and put on the market by W. L. Maloon & Co., 176 Federal street, Boston, Mass.

BOSTON RETAIL HARDWARE ASSOCIATION.

FOR the purpose of making a stronger association of retail Hardwaremen in Boston, Mass., and vicinity, the New England Builders' Material Association has just been organized and incorporated under the laws of Maine with officers as follows:

PRESIDENT, John B. Hunter, John B. Hunter & Co., Boston.

VICE-PRESIDENT, James A. Munroe, Burditt-Williams Company, Boston.

TREASURER, Henry M. Sanders, Boston.

SECRETARY, D. Fletcher Barber, Chandler & Barber, Boston.

DIRECTORS: D. Fletcher Barber, Boston; Calvin M. Nichols, Hoyt Company, Dorchester; Charles B. McCormick, Dock Square Hardware Company, Boston; James P. Mackey, Brookline; Joseph D. Jewett, J. D. Jewett Company, Incorporated, Boston.

The houses represented by the officers and directors will be recognized as among the leading retail Hardware dealers of Boston, and the most active members of the New England Hardware Dealers' Association. The present membership includes other representative retail concerns, and the by-laws provide that any persons or corporations who are retail dealers in Iron, Steel, Metals, Hardware, Paints, or dealers in Builders' Materials, who carry on business in New England may become stockholders in the association. The regular meetings of the Board of Directors will be held at least once each month.

The incorporated company is in no sense a consolidation of the various houses which are stockholders therein, but is intended to act as a clearing house for the collection of debts, correction of abuses in the trade, and other purposes for the general benefit of its members. Offices will be maintained in the Weld Building, 176 Federal street, Boston, where a manager with a staff of clerks will be in charge.

THE MICHIGAN STOVE & CASTER COMPANY, Grand Rapids, Mich., have incorporated with a paid up capital stock of $100,000, $23,000 of which is preferred and $77,000 common. The officers of the company are: Jos. J. Tucker, president; D. W. Giddings, treasurer; F. A. Stone, secretary, and B. P. Kenyon, superintendent. The company manufacture Gasoline Stoves, Casters, Sockets and do special work. They have just installed a new power plant, with a Wickes Bros. upright water tubular boiler, a compound tandem Buckeye engine and generator. Their factory will be electrically driven.

REQUESTS FOR CATALOGUES, &c.

The trade are given an opportunity in this column to request from manufacturers price-lists, catalogues, quotations, &c., relating to general lines of goods.

REQUESTS *for catalogues, price-lists, quotations, &c., have been received from the following houses:*

FROM VAN LIEW-SCOTT HARDWARE COMPANY, Albany, N. Y., who have just been incorporated with a capital stock of $10,000, to carry on the retail business in Builders' Hardware, Mechanics' Tools, Cutlery and Hardware Specialties, at 93 North Pearl street, that city. The officers and directors of the company are J. A. Van Liew, president; F. J. Guilfoyle, vice-president; A. J. Scott, secretary-treasurer; W. D. McMillan and Peter McCabe. The active members of the concern, Messrs. Van Liew and Scott, are thoroughly familiar with the Hardware business, having been identified with the Albany Hardware & Iron Company for the past ten years, Mr. Van Liew as buyer and Mr. Scott as general salesman, making a specialty of the Tool department. The company's store will be thoroughly up to date in all its appointments.

FROM MARTIN E. BIDLACK, Oakwood, Ohio, who has embarked for himself in the General Hardware business, handling also Stoves, Tinware, Paints, Oils and Varnishes, Sash, Doors, Roofing, Spouting, &c. Mr. Bidlack has been manager of the Shisler Hardware store for the past eight years.

FROM MARTZ BROS., Harrisburg, Pa., who have purchased the Hardware business of George K. King, who retires owing to ill health, at 303 Market street. The members of the firm are C. H. and A. Martz, the latter having had several years' experience in the Hardware trade. It is their intention to renovate the store and increase stock. They desire catalogues especially of Shelf Hardware.

FROM MARINE HARDWARE & EQUIPMENT COMPANY, recently organized with a paid in capital of $100,000, who have bought the Lovell Arms Company's plant at South Portland, Maine, and equipped it for the manufacture of Marine Hardware and a general line of Forgings. They also have a complete galvanizing plant and are prepared to finish their own product and handle outside work to the extent of their capacity. J. E. Fisher, formerly treasurer of the Thomas Laughlin Company, Portland, Maine, is treasurer and managing director, and associated with him are Southern and Western capitalists. W. L. Adams, well known in the trade, is superintendent, and the various departments are in charge of experienced and capable men. The company will soon have a line of goods on the market which they intend will embody the latest and best ideas combined with the results of their long experience as individuals in the business. They request catalogues of Tools and equipment likely to be required in the general conduct of the factory.

FROM MILLER & FLAIGLE HARDWARE COMPANY, jobbers and retailers of Hardware and general merchandise, Kansas City, Mo. The company's entire stock in store and warehouses was damaged in the recent floods and they are disposing of the injured goods as speedily as they can with a view to putting in a complete new stock. They will according value catalogues and quotations relative to Hardware and allied lines.

WELLS BROS. COMPANY'S NEW CATALOGUE.

WELLS BROS. COMPANY, Greenfield, Mass., New York office at 56 Reade street, in charge of A. Z. Boyd, have issued a fine new catalogue of Little Giant Screw Cutting Tools and Machinery, containing 115 pages, 6 x 9 inches. The line has been increased largely by the addition of a number of tools, some of which will be new to the trade, while others are only a new product for this company. The assortments of Taps, Dies, Stocks, Reamers and kindred goods for machinists, blacksmiths and metal workers generally, is much larger than heretofore.

PRICE-LISTS, CIRCULARS, &c.

THE SMITH & EGGE MFG. COMPANY, Bridgeport, Conn.: Illustrated catalogue No. 5, relating to Hardware, Plumbers' and Patented Specialties. Among new lines which the company have added are Giant Weldless Chain, Pocket Calipers, Adjustable Clamps and Sash Supports and Locks.

THE STORM MFG. COMPANY, Newark, N. J.: John H. Graham & Co., 113 Chambers street, New York, agents: Illustrated catalogue relating to Dumb Waiters and Elevators. These are shown in a variety of styles, including a Special Invalid Lift, Carriage and Sidewalk Elevators and an Improved Ash Hoist.

THE ANIMAL TRAP COMPANY, Abingdon, Ill.: Out of Sight Traps. Illustrated catalogue relating to Mouse, Rat, Gopher and Small Fur Bearing Animal Traps, Fly Strings, &c.

THE MENEELY BELL COMPANY, Troy, N. Y.: Illustrated catalogue and price-list of Church, Academy, Tower Clock, Factory, Chime, Courthouse, Fire Alarm and other Bells.

R. W. WHITEHURST COMPANY, Norfolk, Va.: Illustrated descriptive catalogue D, with prices, of the Boss Roller, Heart design. These goods are for hand and horse power and range in weight from 150 to 10,000 pounds. Also folder illustrating four styles of Hose Reels.

THE SYRACUSE ARMS COMPANY, Syracuse, N. Y.: Catalogue of the Syracuse Hammerless Guns. The company have made several very material modifications in their Arms, among which is the changing of the shape of the stock; placing a double wedge fast bolt through the extended rib, instead of a single bolt, as heretofore; inletting the stocks of Guns into the frame in such a manner as to prevent all possibility of the stock spreading or splitting at this point, and placing on their better grades of Guns, at no extra charge, a simple device which allows instant changing of an Automatic Ejector Gun into a Nonejector, without the use of tools.

MISCELLANEOUS NOTES.

Thread Gauges, Dies, Taps, Taper Pin Reamers, &c.

Wells Bros. Company, Greenfield, Mass., have recently added many new goods to their previously large line, and are now carrying a full stock at their New York office, 56 Reade street, in charge of A. Z. Boyd, formerly of Alder & Boyd. Among the articles new with them are standard thread gauges, both external and internal, in four assortments, A to D, inclusive. Assortment A, nine in all, are from ¼ to ¾ inch sizes inclusive, increasing by sixteenths. Assortment B, 13 complete, from ¼ to 1 inch inclusive, by sixteenths. Assortments C and D, eight each, include 1⅛ to 2 inches and 2⅛ to 3 inches inclusive respectively, increasing by eighths. The sets of gauges can be furnished in fine hard wood boxes for protection and convenience. Another tool new with the company is an adjustable bevel die with guide in solid square collet, for use in place of solid bolt die. They are made in 17 sizes, ranging from ¼ inch to 1½ inch sizes inclusive. Their line of machinists' hand taps formerly running from 3-16 to 2 inch sizes now extends to 4 inch diameters, those 2⅛ to 3 inch inclusive increasing by eighths, and the remainder by ¼ inches. They are also making standard taper pin reamers tapering ¼ inch per foot, numbered 0 to 13 inclusive, the total lengths of which are from 2 to 16 inches, with small end diameters ranging from 0.135 to 1.009 inches. Still another new line with them is that of burring tools for burring out ends of pipe as well as for use on brass and wood. They are made with round and square shanks for chucks and bit braces and also with handles 10 inches long each way from center of tool.

Holdfast Corn Shock Tightener No. 203.

The Tie Company, Unadilla, N. Y., are calling special attention to their corn shock tightener. The metal portion is made of heavy galvanized wire, to which is attached 12 feet of 5-16-inch sisal rope. In use the rope is drawn into the Holdfast, wire hook and fastens automatically.

Improved Wind Mill Lift Pump Standard.

The accompanying illustration represents a new heavy pump standard for tubular wells. It can be used for 1¼, 1½, 2, 2½ or 3 inch pipe by simply changing the center flange. By removing the four bolts in the flange the

Improved Wind Mill Lift Pump Standard.

plunger and valve may be withdrawn without loosening the pump from either pipe or platform. The standard is put on the market by the Cedar Rapids Pump Company, Cedar Rapids, Mich.

The Twentieth Century Plow.

The plow here shown is offered by W. C. Cousins, Ferrum, Va. The most important feature of the plow, it is remarked, is that two plows can be obtained at prac-

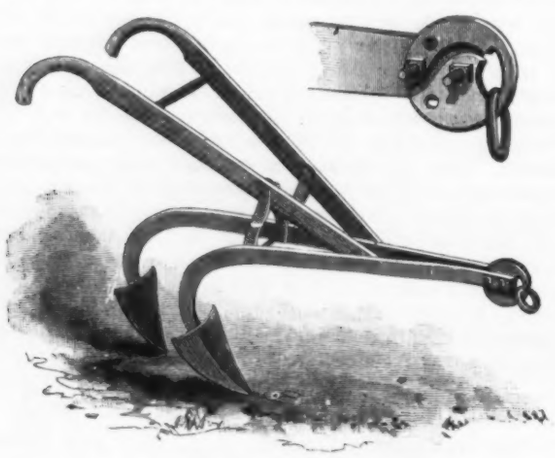


Fig. 1.—The Twentieth Century Plow.

tically the cost of one. It is explained that the bracing in the plow is designed to make it much stronger than double shovel plows now in general use. The plow can be changed from double to single or from single to double in a few minutes. It is pointed out that it is especially

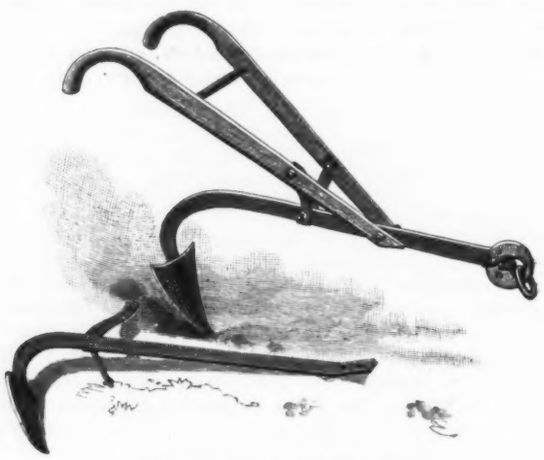
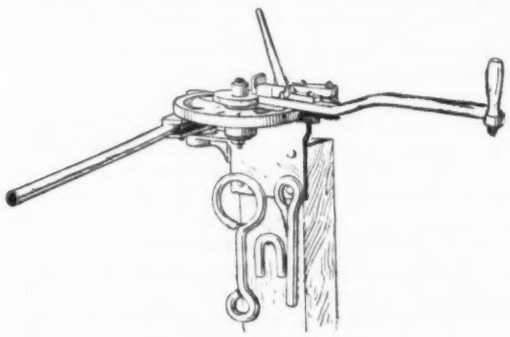


Fig. 2.—Used as a Single Plow.

adapted to plowing tobacco and corn, as the handles do not bruise or break the leaves or stalks.

An Eye Bending Tool.

The Wallace Supply Company, Chicago, are placing on the market a new eye bending tool. Heretofore the company have made but two sizes, Nos. 1 and 2, which could be operated by one man. The new eye bender, No. 3, illustration of which is shown herewith, requires the services of two men, but will bend eyes up to 7 inches,

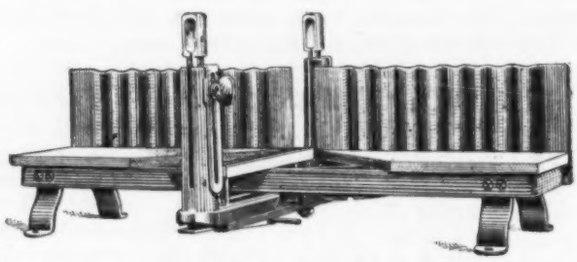


An Eye Bending Tool.

outside diameter, from stock as large as 1⅜ inches, either round or square, and will also bend flat stock for various purposes. The sizes of the eyes can be regulated by having different dies. This latest design of the company's product is said to be especially valuable for making bridge eyes, loops, "U's," links for railroad work, in shipbuilding and in structural iron working.

The Goodell Miter Box.

The Goodell Mfg. Company, Greenfield, Mass., are putting on the market the miter box shown herewith. It is made entirely of Bessemer steel, thus doing away



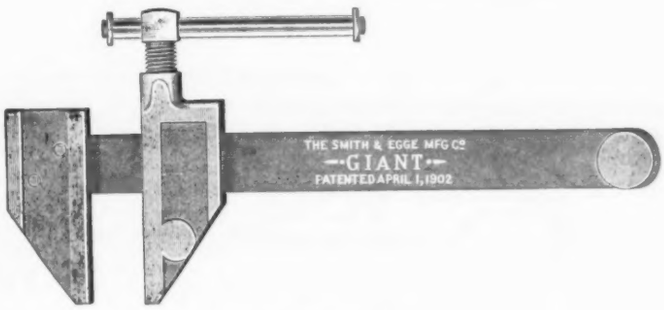
The Goodell Miter Box.

with liability of breakages, and at the same time making it strong and firm. The back is made of cold rolled steel, corrugated to ¼ inch in depth and ½ inch in width, allow-

ing clearance for sawdust. Besides the angles used on regular boxes, by simply turning a lever it can be set to any desired angle. The boxes, which are made in two sizes, give 10½ inches width at right angles and 7¼ inches at miter. Both sizes can be furnished with an extra angle attachment to increase the angle above 45 degrees. No. 2 size is furnished with 24 x 4 and 26 x 4 inch Disston saws, and No. 3 size is furnished with Disston's 28 x 5 inch saw. The manufacturers claim that this is the first all steel miter box ever put on the market.

The Giant Adjustable Clamp.

The accompanying illustration represents an adjustable clamp introduced by the Smith & Egge Mfg. Company, Bridgeport, Conn. It is intended to take the place of the ordinary extension clamp used by machinists, carpenters, tool makers and other mechanics. In use the jaws are drawn together against the work and the screw in the handle bar is tightened to hold the work firmly together or in place. Among the points of excellence the following are mentioned: That it consumes comparatively little time in adjusting; that its construction is such that work can be handled conveniently, especially in working



The Giant Adjustable Clamp.

on small pieces which require drilling, filing, &c., and that with it work can be done expeditiously.

Automatic Sliding Door Opener.

The Perfect Sliding Door Company, Bridgeport, Conn., are introducing the automatic sliding door opener illustrated herewith. This is designed for use between kitchen and dining room and other places where a sliding door of this character would prove convenient. Tread plates are placed in the floor on both sides of the door. These are connected by chains, running over pulleys, to a rod and spring, which in turn are connected by a rod to the push arm near the top of the door frame, an air check being placed immediately above the push arm. In operation a person approaching the door from either side steps upon one of the tread plates, which causes the push arm to slide the door back and out of the way. The door will close itself. It is explained that the door does not close quickly enough to make it necessary for a person to hurry through to get out of its way. The fanning of fumes from the kitchen to the dining room, the upsetting of food, breaking of dishes and danger of collisions, such as are apt to occur with swinging doors, are guarded against, it is pointed out, by the use of this automatic opener.

Automatic Sliding Door Opener.

Out of Sight Fly String.

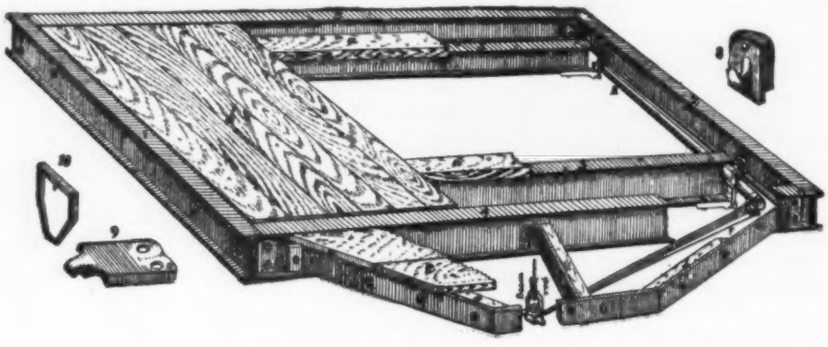
The accompanying cut represents a fly string, consisting of a small tin box, with a string passing through the box, as shown. In use the string is unwound from and drawn through the box, which is ⅝ inch in diameter and contains sufficient paste of a sticky charcter to coat the string its entire length. The string is then suspended from the ceiling, chandelier or anything convenient by means of a small tack, one of which accompanies each string. It is explained that when a fly lights on the string it is held fast by the paste and soon dies. The manufacturers remark that the natural place for flies to light is on objects suspended from the ceiling. The device is put on the market by the Animal Trap Company, Abingdon, Ill.

Out of Sight Fly String.

The Louis Hoffman Hardware Company, Vicksburg, Miss., at their annual meeting on June 20 re-elected their old officers, Louis Hoffman, president; Frank J. Hoffman, vice-president and treasurer. A dividend of 8 per cent. was declared. Mr. Hoffman embarked in business in 1857 and the stock company were formed in 1886. Although occupying at the present time 22 floors 25 x 150, they have decided to build an addition 25 x 50, four stories high.

Steel Frame for Wagon or Stock Scales.

The Chicago Scale Company, Chicago, Ill., recommend their steel frames for scales in place of wood frames, as they are strong, heavy and durable. The frame shown in the accompanying cut requires no pit, and is made of double T iron or steel, which is alluded to as forming a good surface for resting on the foundation, as well as on top for wheels to pass over. A casting is fitted into each corner and the four girders forming the frame are strongly bolted together. The projection for



Steel Frame for Wagon or Stock Scales.

the levers, which extends to the beam rod, is formed of heavy flat iron or steel, which is bolted to the girder with a brace. A piece of 2 x 4 is bolted to the inside of this to nail the plank to which covers the space to the beam box. Under the outside of the frame is the foundation, of brick, stone or blocks. As the scale requires no pit, it may be set on the top of the ground, if desired. The platform supports are also made of double T iron or steel, the same as the frame, only larger, with cast iron feet bolted on the bottom, and a 2 x 8 plank bolted on top, to which the covering is nailed. The scales are referred to as being made throughout of the best iron, steel and brass, and as being durable. It is pointed out that when a steel frame is used all expense of framing is saved, and that two men can set the thing up in an hour's time after the foundation is ready; also that there is no risk of getting anything wrong.

The Double Hercules Strap Hinge.

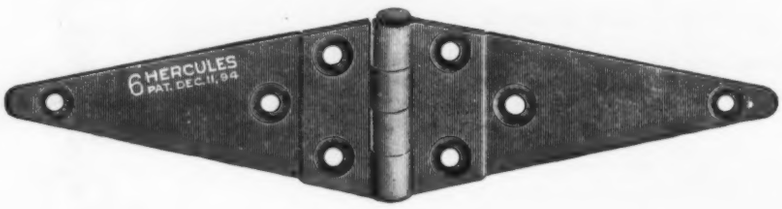
The Cleveland Lock Company, Cleveland, Ohio, are offering double strap and T hinges, an illustration of the former being given herewith. They are made of steel, of the highest tensile strength and great toughness, it is explained. Each hinge is composed of two pieces of equal length, and has a double thickness of steel formed completely over and around the hinge pin, giving additional strength with no waste of steel. It is pointed out that this construction makes both sides of the hinge equally strong, and that it has a closed in straight steel pin which is not bent by riveting, also four hubs, making the hinge swing true. The screws pass through the top and bottom parts of the hinge, being placed where they are most effective. The hinges, it is remarked, will hold any door, however heavy, as long as the screws remain in the wood, as it is impossible to shear the steel over the pin against the holding capacity of the screws. The company state that they warrant every hinge without question, no matter how it is used. A 6-inch hinge will, it is claimed, do the work of an old style 8-inch, as it is as wide at the working parts and fully as strong. The hinges are all japanned, have sizes stamped on each hinge and are neatly wired, one pair in a bundle, to prevent the outside or face of the hinge being scratched.

Starrett Draftsmen's Scale.

The scale herewith illustrated has tilting studs, so placed that each of its four corners, with different graduations, will come in contact with the paper by its own gravity when resting on the studs, with the back edge raised at an angle of about 30 degrees. The scale is made in two numbers, graduated on each of the four corners in parts of inches, as follows: No. 405, 10ths,

Starrett Draftsmen's Scale.

40ths, 50ths, 100ths; No. 405A, 8ths, 16ths, 32ds, 64ths. Another scale, No. 405M, is graduated in the metric system, one edge of each side in millimeters, the other edge in ½ mm. The scales are being introduced by the L. S. Starrett Company, Athol, Mass.; New York office, 123 Liberty street.



The Double Hercules Strap Hinge.

Clipper Pot and Kettle Scraper.

Taplin Mfg. Company, New Britain, Conn., and 155 Chambers street, New York, have put on the market in connection with other household specialties the Clipper pot and kettle scraper No. 1, as here illustrated about two-thirds size. It is made of cast iron and so shaped as effectively to loosen particles of food adhering to the bottom and sides of cooking pots and other culinary utensils used in the preparation of food.

Clipper Pot and Kettle Scraper.